TRAFFIX
TRAFFIC AND TRANSPORT PLANNERS

PLANNING PROPOSAL

Proposed Land Rezoning
Lachley Estate South (Stage 1)

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TRAFFIX

CONTENTS

1. INTRODUCTION

TRAFFIX has been commissioned by Brisull Industries Forbes P/L to undertake a traffic impact assessment in support of a planning proposal for the Lachley Estate South (Stage 1) at 1 Lachley Street, Forbes. The proposal involves the rezoning of the land from 'RU1 Primary Production' to part 'E3 Productivity Support'. The development is located within the Forbes Shire Council local government area (LGA) and has been assessed under that Council's controls.

This report documents the findings of our investigations and should be read in the context of the Statement of Environmental Effects (SEE), prepared separately.

The report is structured as follows:

- Section 2: Describes the site and its location
- Section 3: Documents existing traffic conditions
- Section 4: Describes the proposed development
- Section 5: Assesses the parking requirements
- Section 6: Assesses traffic impacts
- Section 7: Discusses access and internal design aspects
- Section 8: Presents the overall study conclusions

2. LOCATION AND SITE

The subject site known as Lachley Estate South at 1 Lachley Street, Forbes is located approximately 2.1 kilometres north of Forbes Railway Station and is legally identified within the southwest section of Lot 1 in DP113924.

The site is irregular in configuration and has a total site area of approximately 72.2 hectares and is currently zoned RU1 Primary Production under the Forbes Local Environmental Plan (LEP) 2013.

The majority of the site currently accommodates vacant land, with existing structures and dwellings located on the southern section of the site, respectively. The main existing vehicular access to the site is via Lachley Street and Wyndham Avenue, with an informal vehicular access at the intersection of Calarie Road and School Road.

A Location Plan is presented in **Figure 1**, with a Site Plan presented in **Figure 2**.

Figure 1: Location Plan

Figure 2: Site Plan

3. EXISTING TRAFFIC CONDITIONS

3.1 Road Network

The road hierarchy in the vicinity of the site is shown in **Figure 3** with the following roads of particular interest:

- Newell Highway: a TfNSW Highway (HW17) that traverses north-south between the Queensland border at Goondiwindi in the north and the Victorian border at Tocumwal in the south. Within the vicinity of the site, it is subject to 80 km/h speed zoning and accommodates a single lane of traffic in each direction. Newell Highway is a TfNSW approved 26.0 metre B-double route.
- Wyndham Avenue: a local road that traverses east-west between Angus Street in the east and Farnell Street in the west. It is subject to 50 km/h speed zoning and accommodates a single lane of traffic in each direction. Wyndham Avenue is a TfNSW approved 26.0 metre B-double route, between Angus Street and Lachley Street.
- Lachley Street: a local road that traverses north-south between a dead end in the north and Wyndham Avenue in the south. It is subject to 50 km/h speed zoning and accommodates a single lane of traffic in each direction. Lachley Street is a TfNSW approved 26.0 metre B-double route.
- Calarie Road: a local road that traverses north-south between Warregal Road in the north and Blackett Street in the south. It is subject to 50km/h speed zoning and accommodates a single lane of traffic in each direction.

It can be seen from **Figure 3** that the site is ideally located with respect to the main arterial road serving the region, being Newell Highway. As such, traffic can effectively be distributed onto the wider road network, minimising traffic impacts.

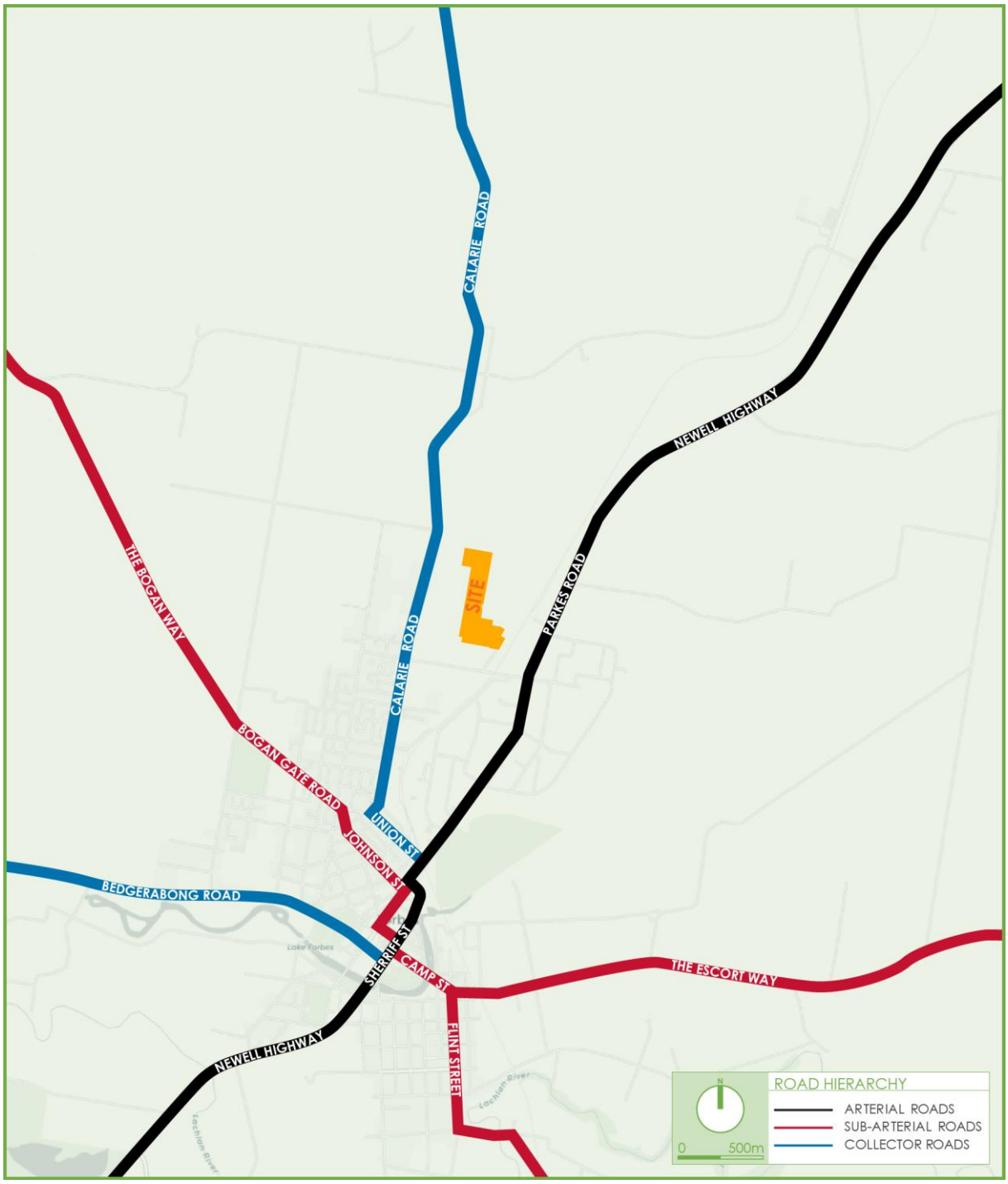


Figure 3: Road Hierarchy

3.2 Key Intersection

3.2.1 Newell Highway (Parkes Road) and Wyndham Avenue

It can be seen from **Figure 4** that the intersection of Newell Highway and Wyndham Avenue is a four-legged priority intersection, with Newell Highway being the major road.

Figure 4: Intersection of Newell Highway and Wyndham Avenue

The main attributes of each approach are outlined below:

- Newell Highway (north-south)
  - The northern approach provides two (2) lanes, including one (1) through lane from which left-turns can be made and one (1) right-turn lane.
  - The southern approach provides three (3) lanes, including one (1) short through lane from which left-turns can be made, one (1) through lane and one (1) right-turn lane.
- Wyndham Avenue (east-west)
  - The eastern and western approaches each provide a single lane from which all movements can be made.
  - It is noted that there is sufficient area at both approaches prior to Newell Highway to enable left-turns to be made, while a vehicle is waiting to go through or turn right.

3.2.2 Wyndham Avenue and Lachley Street

It can be seen from **Figure 5** that the intersection of Wyndham Avenue and Lachley Street is a three-legged priority intersection, with Wyndham Avenue being the major road. It is noted that the south leg (Patterson Street) is an unpaved road.

Figure 5: Intersection of Wyndham Avenue and Lachley Street

The main attributes of each approach are outlined below:

- Wyndham Avenue (east-west)
  - The eastern approach provides a single through lane from which right-turns can be made.
  - The western approach provides a single through lane from which left-turns can be made.
- Lachley Street (north)
  - The northern approach provides a single lane from which left-turns and right-turns can be made.

3.2.3 Wyndham Avenue and Calarie Road

It can be seen from **Figure 6** that the intersection of Wyndham Avenue and Calarie Road is a four-legged roundabout intersection, with the north/west legs each providing an island median and south/east legs each providing painted medians.

Figure 6: Wyndham Avenue and Calarie Road

The main attributes of each approach are outlined below:

- Wyndham Avenue (east-west)
  - The eastern approach provides a single through lane from which all movements can be made.
  - The western approach provides a single through lane from which all movements can be made.
- Calarie Road (north-south)
  - The northern approach provides a single through lane from which all movements can be made.
  - The southern approach provides a single through lane from which all movements can be made.

3.2.4 Calarie Road and School Road

It can be seen from **Figure 7** that the intersection of Calarie Road and School Road is a three-legged priority intersection, with Calarie Road being the major road.

Figure 7: Intersection of Calarie Road and School Road

The main attributes of each approach are outlined below:

- Calarie Road (north-south)
  - The northern approach provides a single through lane from which right-turns can be made.
  - The southern approach provides a single through lane from which left-turns can be made.
- School Road (west)
  - The western approach provides a single lane from which left-turns and right-turns can be made.

3.3 Crash Data Analysis

Crash data for the relevant section of Wyndham Avenue was obtained from TfNSW and used to assess the crash history in proximity of the subject site, with the most recent 5-year crash data between 2018-2022. Crashes involving vehicles travelling in both directions of Wyndham Avenue within the vicinity of the site access were used for the assessment.

As per Rule 287 (3) of the Australian Road Rules, crashes are only recorded if they are reported to the police and when one of the following occurs:

- Any person is killed or injured;
- Drivers involved in the crash do not exchange particulars; and
- When a vehicle involved in the crash is towed away.

The crash data was analysed in the following degree categories:

Fatal	a crash in which at least one person was killed.
Serious injury	a crash involving at least one person identified in a police report and matched to a health record indicating a hospital stay due to injuries sustained in a crash or is identified as an iCare (Lifetime Care) participant AND no one was killed in the crash.
Moderate injury	a crash involving at least one person identified in a police report who is matched to a health record that indicates that they were treated at an emergency department but were not admitted for a hospital stay or is matched to a CTP claim indicating a moderate or higher injury AND no one was killed or seriously injured.
Minor/Other injury	a crash involving at least one person identified as an injury in a police report who is not matched to a health record that indicates the level of injury severity or is matched to a minor injury CTP claim AND no one was killed, seriously injured or moderately injured.
Non-casualty (towaway)	a crash in which no one was killed or injured but at least one motor vehicle was towed away.

The crash data is shown in **Appendix A**. The crash map presented in terms of degree and type (road user movement describing the first impact of the crash), with a degree summary provided in **Table 1**.

Table 1: Crash Degree Summary (2018-2022)

Year	Crash Degree					TOTAL
	Fatal	Serious Injury	Moderate Injury	Minor/other Injury	Non-casualty (towaway)	
2018	-	-	-	-	-	**-**
2019	-	-	-	-	-	**-**
2020	-	-	-	-	-	**-**
2021	-	-	1	-	-	**1**
2022	-	-	1	-	-	**1**
TOTAL	**-**	**-**	**2**	**-**	**-**	**2**

The key outcomes from the two (2) reported crashes between January 2018 and December 2022 include:

- No fatalities reported and no crashes involved pedestrians;
- All crashes occurred in daylight and are located more than 400 metres from the site;
- 2021 – moderate injury involving a 'cross traffic' from Wyndham Avenue to Newell Highway;
- 2022 – moderate injury involving a 'cross traffic' from Wyndham Avenue to the Calarie Road roundabout.

Based on the available information, it is understood that nature of Wyndham Avenue has an extremely low crash rate when considering the traffic volume through and the existing road geometry.

4. DESCRIPTION OF PROPOSED DEVELOPMENT

A detailed description of the proposed development is provided in the SEE, prepared separately. In summary, the planning proposal for which approval is now sought comprises the following components:

- Rezoning of the land from 'RU1 Primary Production' to 'E3 Productivity Support', with a total of 56 allotments, including:
  - 55 x light industrial allotments (Lots 1-34 and Lots 36-56); and
  - 1 x Council pound / holding yard (Lot 35).
- Internal local road network throughout the subdivision, with 20-30 metre wide road reserves; and
- Provision of the following accesses to the local road network, including:
  - Upgrade and connection of Lachley Street; and
  - Addition of an eastern leg at the Calarie Road and School Road intersection.

The parking and traffic impacts arising from the development are discussed in **Section 5** and **Section 6**. Reference should be made to the plans submitted separately to Council which are presented at reduced scale in **Appendix B**.

5. PARKING REQUIREMENTS

5.1 Car Parking

The proposed development comprises various future allotments, the majority of which are envisaged to be light industrial developments. The Forbes Development Control Plan (DCP) 2013 provides the following car parking rates for various industrial developments and associated gross floor areas (GFA):

Industries	1 space per 2 employees;
Warehouse	1 space per 90m^2 GFA;
Motor vehicle repair workshops	1 space per 55m^2 GFA;
Motor vehicle showrooms	1 space per 35m^2 GFA plus 1 space per 160m^2 GFA outdoor display area;
Service stations	Minimum of 10 spaces; and
Car tyre retail outlet	3 spaces per work bay.

As the various allotments within the proposed development have yet to be determined, all parking requirements (car, accessible, motorcycle, bicycle, etc.) of any future allotment would be assessed at a future stage and be subject to any future site-specific DCP or amended DCP that includes the subject site.

5.2 Refuse Collection and Servicing

The proposed development includes an internal road network with 20-30 metre wide road reserves. As such, refuse collection and servicing for each allotment would be assessed at a future stage, noting that the internal road network has been proposed to generally cater for industrial uses and has been designed to accommodate commercial vehicles.

6. TRAFFIC AND TRANSPORT IMPACTS

6.1 Development Trip Generation

6.1.1 Light Industrial Component

The proposal involves the rezoning of the land from 'RU1 Primary Production' to 'E3 Productivity Support', noting the following key aspects:

- The proposed use of each individual allotment and associated GFA of the E3 Productivity Support component have yet to be determined. As such, the light industrial component of the development is considered a business park for the purposes of this assessment; and
- There are a total of 55 light industrial allotments, comprising:
  - 54 x allotments (Lots 1-3, 5-34 & 36-56) with an area of 135,000m^2 (average 2,500m^2);
  - 1 x allotment (Lot 4) with a GFA of 400m^2.

With the above in mind, the TfNSW Guide to Traffic Impact Assessment 2024 (TfNSW GTIA) provides reference material for business parks based on GFA. More specifically, the Business Parks (2012) – Data Report provides the GFA and total site areas of the various surveyed business parks within regional areas. More specifically, 'Site 11' in Dubbo, which is considered the most applicable given the comparable demographic and distance to the site, was identified to have a GFA of 14,419m^2 and total site area of 63,000m^2. This results in a GFA to site area ratio of approximately 22.9%. Application of this ratio to the proposed 135,000m^2 area (54 allotments) plus 400m^2 GFA (Lot 4), results in an estimated yield of 31,298m^2 GFA for the light industrial component, which is considered appropriate and has been adopted for the purposes of this assessment.

The TfNSW GTIA 2024 provides updated traffic generation rates for business parks within regional areas at a rate of 0.69 and 0.78 vehicle trips per 100m^2 GFA during the morning and evening peak periods, respectively. Application of these rates to the proposed 31,298m^2 GFA and adopting an 80/20 modal split, results in the following estimated traffic generation:

- 216 vehicle trips per hour during the morning peak period (173 in, 43 out)
- 244 vehicle trips per hour during the evening peak period (49 in, 195 out)

The above estimated traffic generation was then separated into light vehicles and heavy vehicles. The TfNSW Business Parks (2012) – Data Report for 'Site 11' in Dubbo provides the travel mode percentage of 78% light vehicles and 22% heavy vehicles. Application of these rates, results in the following estimated traffic generation separated into light and heavy vehicles:

- 216 vehicle trips per hour during the morning peak period (173 in, 43 out)
  - 168 light vehicles (135 in, 33 out)
  - 48 heavy vehicles (38 in, 10 out)
- 244 vehicle trips per hour during the evening peak period (49 in, 195 out)
  - 190 light vehicles (38 in, 152 out)
  - 54 heavy vehicles (11 in, 43 out)

6.1.2 Council Pound / Holding Area Component

The development proposes a single Council pound / holding area allotment (Lot 35) with a maximum of four (4) staff on-site at any given time. This results in the following estimated traffic generation for the Council pound / holding area component (light vehicles only):

- 4 vehicle trips per hour during the morning peak period (4 in, 0 out)
- 4 vehicle trips per hour during the evening peak period (0 in, 4 out)

6.1.3 Combined Traffic Generation

The combined traffic generation of the proposed development is summarised as follows, separated into light and heavy vehicles:

- 220 vehicle trips per hour during the morning peak period (177 in, 43 out)
  - 172 light vehicles (139 in, 33 out)
  - 48 heavy vehicles (38 in, 10 out)
- 248 vehicle trips per hour during the evening peak period (49 in, 199 out)
  - 194 light vehicles (38 in, 156 out)
  - 54 heavy vehicles (11 in, 43 out)

6.2 Traffic Surveys

For the purposes of assessing the traffic impacts of the proposed development, traffic count surveys were undertaken on Tuesday 2 July 2024 (not within school holidays) during the morning and evening peak periods at the following key intersections:

- Newell Highway, Wyndham Avenue and Parkes Road;
- Wyndham Avenue, Lachley Street and Patterson Street;
- Wyndham Avenue and Calarie Road; and
- Calarie Road and School Road.

6.3 Future Intersection

The proposal involves a future connection to the internal road network at the Calarie Road and School Road intersection to form a four-legged intersection. It can be seen from **Figure 8** that the proposed Calarie Road, School Road and New Road intersection is a four-legged priority controlled intersection, with Calarie Road being the major road.

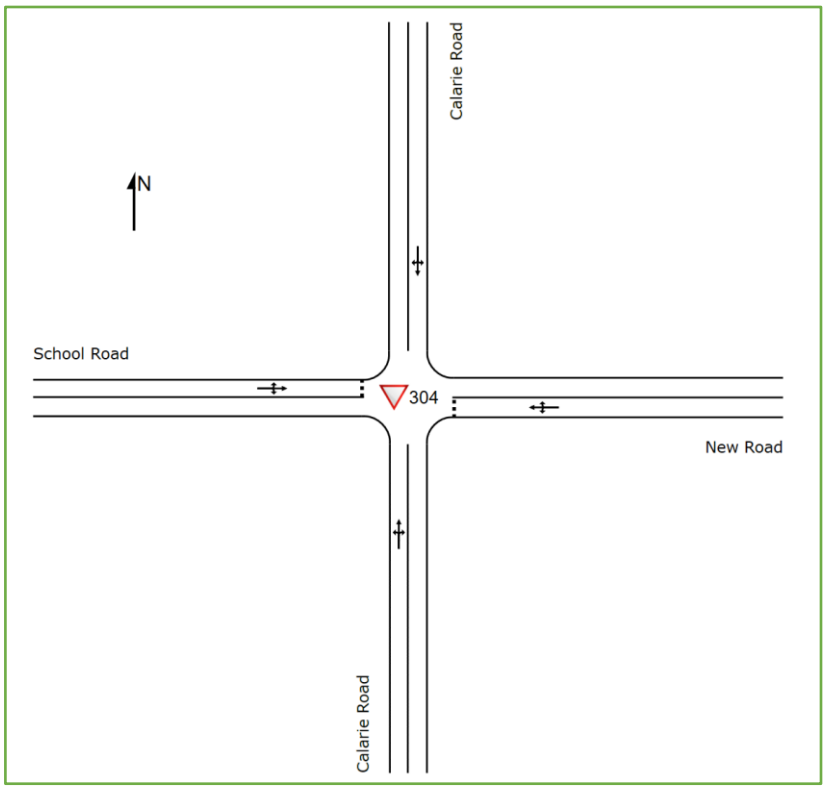


Figure 8: Calarie Road, School Road and New Road Intersection

The main attributes of each approach are outlined as follows:

- Calarie Road (north-south)
  - The northern and southern approaches each provide a single through lane from which left-turns and right-turns can be made.
- School Road (west)
  - The western approach provides a single through lane from which left-turns and right-turns can be made.
- New Road (east)
  - The eastern approach provides a single through lane from which left-turns and right-turns can be made.

6.4 Traffic Distribution

Journey to Work (JTW) data from the 2016 Census for the Forbes SA2 area has been used to determine the future overall distribution of traffic to and from the proposed development, noting the following key aspects:

- It is understood that there will be a future service station development situated on the northwest corner of the Newell Highway and Wyndham Avenue intersection. As such, this traffic generation has been included in the background traffic for all future scenarios;
- 100% heavy vehicles of the development are proposed to utilise the Newell Highway via the Lachley Street access;
- The light vehicles of the development are primarily envisaged to utilise the main vehicular access, being Lachley Street, resulting in the following traffic distribution:
  - 70% light vehicles onto Newell Highway via Lachley Street (eastbound);
  - 20% light vehicles onto Wyndham Avenue via Lachley Street (westbound); and
  - 10% light vehicles onto Calarie Road via the New Road.

  The above traffic distributions are considered appropriate, given the proportion of allotments within the vicinity of the New Road and large residential catchment southwest of the subject site;

- JTW data identified that approximately 92% of workers would travel southbound (majority resided within Forbes) and 8% of workers would travel northbound. However, given the scale of the proposed development, being primarily a large business estate, a proportion of workers are envisaged to reside from Parkes (approximately 25-minute drive north), thereby resulting in the following traffic distribution:
  - 80% light and heavy vehicles travelling to and from the south; and
  - 20% light and heavy vehicles travelling to and from the north.

The traffic distribution of the proposed development have been distributed onto the aforementioned key intersections in **Section 3.2** for the existing scenario, with the proposed intersection in **Section 6.3** added for all future scenarios, as presented in **Figure 9** (morning peak period) and **Figure 10** (evening peak period) below.

Figure 9: Traffic Distribution – AM Peak Period

Figure 10: Traffic Distribution – PM Peak Period

6.5 Scenarios

In order to assess the potential impacts of the proposed development, the following scenarios were identified:

- 2024 Existing Scenario;
- 2028 Base Case;
- 2028 Base Case + Development; and
- 2038 Base Case + Development (10-year horizon traffic forecast post-commencement).

6.6 Growth Rate

In order to estimate the additional traffic associated with 10 year and 20 year background growth scenarios, reference should be made to the NSW Department of Planning and Environment's 2041 populations projections for the Forbes area (SA2 zone). The data from the NSW Department of Planning suggests that the Forbes population will increase cumulatively at a rate of 1.43% per annum. It is not known where development or the population increase will occur within Forbes and as such, the above growth rate has been adopted at all movements at all local intersections for the purposes of a conservative assumption.

6.7 Intersection Performance

The surveys were analysed and networked using SIDRA Intersection 9.1 to determine their performance characteristics under existing traffic conditions, with the optimal indicator of the level of service at an intersection is the average delay experienced by vehicles at that intersection, noting the following principles:

- Average delay over all movements should be taken for signalised intersections; and
- Critical movement with the highest average delay adopted for priority control intersections.

The SIDRA model produces a range of outputs, the most useful of which are the degree of saturation (DoS) and average vehicle delay per vehicle (AVD). The AVD is in turn related to a level of service (LoS) criteria. These performance measures can be interpreted using the following explanations:

DoS the DoS is a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DoS approaches 1, it is usual to attempt to keep DoS to less than 0.9. When DoS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. In this regard, a practical limit at 1.1 can be assumed. For intersections controlled by roundabout or give way / stop control, satisfactory intersection operation is generally indicated by a DoS of 0.8 or less.

AVD the AVD for individual intersections provides a measure of the operational performance of an intersection. In general, levels of acceptability of AVD for individual intersections depend on the time of day (motorists generally accept higher delays during peak commuter periods) and the road system being modelled (motorists are more likely to accept longer delays on side streets than on the main road system).

LoS this is a comparative measure which provides an indication of the operating performance of an intersection as shown in **Table 2** below.

Table 2: Intersection Performance Indicators (TfNSW)

Level of Service (LoS)	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way, Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

The traffic impacts arising from the proposed development during the weekday critical morning and evening peak periods have been assessed by loading the distributed traffic volumes into the SIDRA Intersection network model. The results of this software modelling are summarised below, with the detailed results for individual approaches included within the SIDRA outputs provided in **Appendix C**.

6.7.1 2024 Existing

Table 3: Intersection Performance for 2024 Existing Scenario

Intersection	Type	Period	Degree of Saturation	Average Delay	Level of Service
Newell Highway and Wyndham Avenue	Priority	AM	0.128	14.7	B
		PM	0.056	16.2	B
Wyndham Avenue and Lachley Street	Priority	AM	0.003	5.3	A
		PM	0.003	5.2	A
Wyndham Avenue and Calarie Road	Roundabout	AM	0.091	9.1	A
		PM	0.090	8.2	A
Calarie Road, School Road and New Road	Priority	AM	0.013	7.0	A
		PM	0.020	7.0	A

It can be seen from **Table 3** that within the 2024 Existing scenario, all intersections are currently operating in good operation (LoS A) or good with acceptable delays and spare capacity (LoS B).

6.7.2 2028 Base Case

Table 4: Intersection Performance – 2028 Base Case

Intersection	Type	Period	Degree of Saturation	Average Delay	Level of Service
Newell Highway and Wyndham Avenue	Priority	AM	0.049	15.7	B
		PM	0.068	20.1	B
Wyndham Avenue and Lachley Street	Priority	AM	0.003	5.3	A
		PM	0.003	5.2	A
Wyndham Avenue and Calarie Road	Roundabout	AM	0.096	9.1	A
		PM	0.095	8.2	A
Calarie Road, School Road and New Road	Priority	AM	0.014	7.0	A
		PM	0.021	7.0	A

It can be seen from **Table 4** that within the 2028 Base Case scenario that includes the future service station within the background traffic, all intersections continue to operate in good operation (LoS A) or good with acceptable delays and spare capacity (LoS B).

6.7.3 2028 Base Case + Development

Table 5: Intersection Performance – 2028 Base + Development

Intersection	Period	Scenario	Degree of Saturation	Average Delay	Level of Service
Newell Highway and Wyndham Avenue (Signalised)	AM	2028 Base	0.049	15.7	B
		2028 Base + Development	0.060	21.6	B
	PM	2028 Base	0.068	20.1	B
		2028 Base + Development	0.063	18.7	B
Wyndham Avenue and Lachley Street (Priority)	AM	2028 Base	0.003	5.3	A
		2028 Base + Development	0.041	7.3	A
	PM	2028 Base	0.003	5.2	A
		2028 Base + Development	0.158	6.6	A
Wyndham Avenue and Calarie Road (Roundabout)	AM	2028 Base	0.096	9.1	A
		2028 Base + Development	0.126	9.1	A
	PM	2028 Base	0.095	8.2	A
		2028 Base + Development	0.122	8.3	A
Calarie Road, School Road and New Road (Priority)	AM	2028 Base	0.014	7.0	A
		2028 Base + Development	0.021	7.1	A
	PM	2028 Base	0.021	7.0	A
		2028 Base + Development	0.023	7.0	A

It can be seen from **Table 5** that within the 2028 Base + Development scenario, there are no reductions in level of service (LoS A and LoS B), with minor changes in average intersection delay for all intersections during both peak periods. As such, the development is considered supportable from a traffic planning perspective, with no external improvements required to facilitate the development.

6.8 Sensitivity Test

In order to forecast the traffic volumes at the 10-year design horizon post-commencement, a 2038 sensitivity test scenario was conducted, as summarised in **Table 6** below.

Table 6: Intersection Performance – 2038 Base + Development (Sensitivity Test)

Intersection	Type	Period	Degree of Saturation	Average Delay	Level of Service
Newell Highway and Wyndham Avenue	Priority	AM	0.083	26.9	B
		PM	0.080	22.2	B
Wyndham Avenue and Lachley Street	Priority	AM	0.042	7.5	A
		PM	0.160	6.7	A
Wyndham Avenue and Calarie Road	Roundabout	AM	0.142	9.1	A
		PM	0.137	8.3	A
Calarie Road, School Road and New Road	Priority	AM	0.023	7.1	A
		PM	0.026	7.0	A

It can be seen from **Table 6** that the 2038 sensitivity test scenario results in minor changes in average intersection delay and no reductions to level of service for all intersections. As such, all key intersections surrounding the site are anticipated to continue experiencing good operation at a 10-year design horizon post-commencement scenario.

7. ACCESS AND DESIGN ASPECTS

7.1 Vehicular Accesses

The vehicular accesses of the subject site are proposed via the following existing intersections:

- The Wyndham Avenue, Lachley Street and Patterson Street intersection, with the main vehicular access proposed from Lachley Street. This vehicular access is proposed to accommodate light and heavy vehicles; and
- The Calarie Road and School Road intersection, with the alternate vehicular access proposed from a new road located on the eastern leg of the intersection. This vehicular access is proposed to accommodate light vehicles.

7.2 Internal Roads

The proposal involves an internal road network that provides 20-30 metre wide road reserves that would provide vehicular access to each individual allotment. These road reserves are proposed to accommodate 26.0 metre long B-double vehicles, which is considered appropriate, given the proposed industrial nature of each allotment.

7.3 Public and Active Transport

There is a single bus stop situated on the corner of Calarie Road and Alder Street, which provides bus services throughout the Forbes CBD. The internal road network of the proposed development provides 20-30 metre wide road reserves that are able to accommodate light and heavy vehicles. Accordingly, future discussions with TfNSW and the bus operator should be considered in order to extend the existing bus route to include bus stops within the internal road network.

7.4 Turn Warrant Assessment

Austroads Guide to Traffic Management Part 6 provides the following warrants for turn treatments at unsignalised intersections.

The *Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management*, Section 3.3.6 provides the warrants for basic (BA), auxiliary lane (AU) and

channelised (CH) turn treatments. More specifically, Figure 3.25 provides the warrants for turn treatments on major roads at unsignalised intersections with a design speed equal to less or less than (**Figure 13**) and a design speed between 70km/h and 100km/h (**Figure 14**). Figure 3.26 of the Guide also provides the major road volume calculations, and this is presented in **Figure 15**.

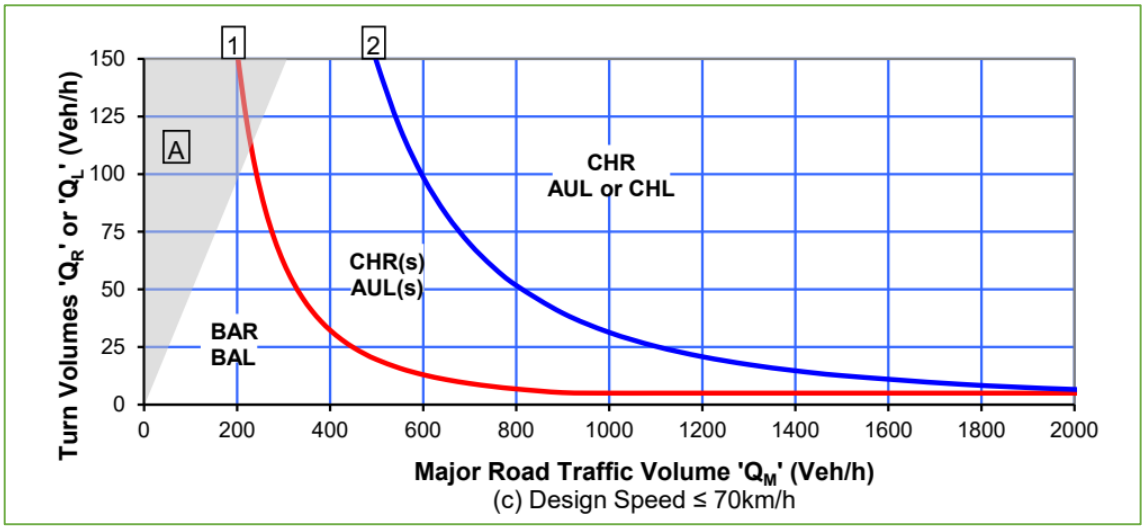


Figure 11: Austroads Turn Warrant (Design Speed < 70km/h)

Source: AGTM06 Figure 3.25(c)

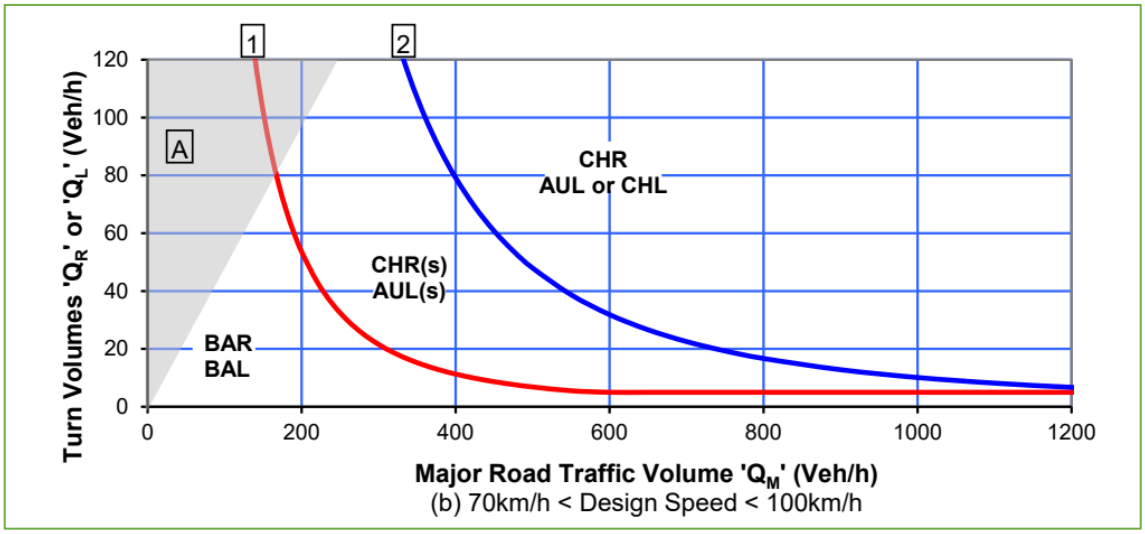
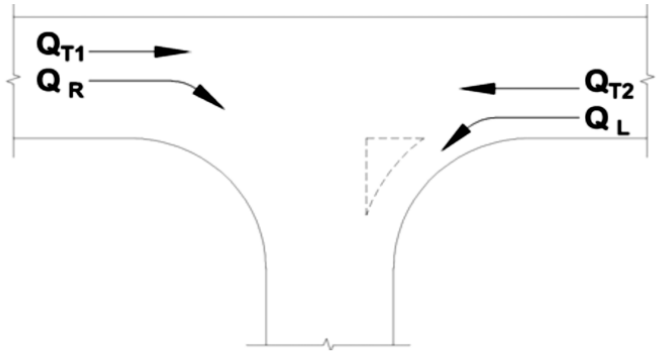


Figure 12: Austroads Turn Warrant (70km/h < Design Speed < 100km/h)

Source: AGTM06 Figure 3.25(b)



Road type	Turn type	Splitter island	Q_M (veh/h)
Two-lane two-way	Right	No	= $Q_{T1} + Q_{T2} + Q_L$
		Yes	= $Q_{T1} + Q_{T2}$
	Left	Yes or no	= Q_{T2}
Four-lane two-way	Right	No	= 50% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 50% x $Q_{T1} + Q_{T2}$
	Left	Yes or no	= 50% x Q_{T2}
Six-lane two-way	Right	No	= 33% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 33% x $Q_{T1} + Q_{T2}$
	Left	Yes or no	= 33% x Q_{T2}

Figure 13: Calculation of the Major Road Volumes

Source: AGTM06 Figure 3.26

It can be seen from **Figure 13** and **Figure 14** that the type of turn treatment required is based on the major road traffic volume (Q_M) and turn volumes ($Q_{L/R/T1/T2}$) of the proposed development. The above warrants were utilised to assess the following intersections:

7.4.1 Newell Highway and Wyndham Avenue

In reference to **Section 3.2.1**, this intersection already contains designated right-turn lanes on both sides of the major road (Newell Highway) and a short through lane from which left-turns can be made to the site. As such, warrant testing is not considered necessary for this intersection, noting that the SIDRA intersection analysis in **Section 6.7** identified no reduction in level of service.

7.4.2 Wyndham Avenue, Lachley Street and Patterson Street

In reference to **Section 6.4**, the traffic distributions associated with the proposed development equate to 199 right-turning (Q_R) vehicles and 83 left-turning (Q_L) vehicles. The traffic surveys for

this intersection identified 68 westbound (Q_{T1}) vehicles and 87 eastbound (Q_{T2}) vehicles. Application of the above results in the following:

- Q_M of 238 veh/h and Q_R of 199 veh/h, resulting in the requirement for CHR treatment; and
- Q_M of 87 veh/h and Q_L of 83 veh/h, resulting in the requirement for BAL treatment.

Accordingly, it is recommended that a CHR treatment be provided due to the crest and reduced visibility to vehicles approaching from the east. Although a BAL treatment is required under Austroads, it is not considered necessary, given the visibility provided to vehicles approaching from the west and SIDRA modelling results identifying minimal queuing along the major road for this intersection.

7.4.3 Calarie Road, School Road and New Road

In reference to **Section 6.4**, the traffic distributions associated with the proposed development equate to 40 right-turning (Q_R) vehicles and 10 left-turning (Q_L) vehicles. The traffic surveys for this intersection identified 21 northbound (Q_{T1}) vehicles and 34 southbound (Q_{T2}) vehicles. Application of the above results in the following:

- Q_M of 65 veh/h and Q_R of 40 veh/h, resulting in the requirement for BAR treatment; and
- Q_M of 34 veh/h and Q_L of 10 veh/h, resulting in the requirement for BAL treatment.

Although a BAR and BAL treatments are required for this intersection under Austroads, these treatments are not considered necessary, given the visibility provided to vehicles approaching from the north/south and SIDRA modelling results identifying minimal queuing along the major road for this intersection.

7.5 Swept Path Analysis and Concept Drawings

The development requires no major intersection upgrades, with all heavy vehicles proposed to utilise Newell Highway, Wyndham Avenue and Lachley Street, which are all TfNSW identified 26.0 metre long B-double routes. Accordingly, swept path analysis and preliminary concept drawings are not considered necessary.

8. CONCLUSIONS

In summary:

- The planning proposal seeks approval for the rezoning of the land from 'RU1 Primary Production' to part 'E3 Productivity Support' for the Lachley Estate South (Stage 1) at 1 Lachley Street, Forbes.
- The development proposes various allotments that are envisaged to mainly comprise of light industry developments and a Council pound / holding yard, resulting in a traffic generation of 220 and 248 vehicle trips per hour during the morning and evening peak periods, respectively.
- The traffic generation associated with the development has been analysed using SIDRA Intersection 9.1 for various scenarios, with all intersections experiencing minor changes in average intersection delay and no reductions in level of service (LoS A and LoS B) during the 2028 Base + Development scenario; and
- For the purposes of a sensitivity test, the above intersections were included within a '2038 Sensitivity Test' scenario, which resulted in minor increases in average intersection delay and no reductions in level of service. As such, all key intersections surrounding the site are anticipated to continue experiencing good operation at a 10-year design horizon post-commencement scenario.

This traffic impact assessment therefore demonstrates that the subject application is supportable on traffic planning grounds. TRAFFIX anticipates an ongoing involvement during the development approval process.

APPENDIX A

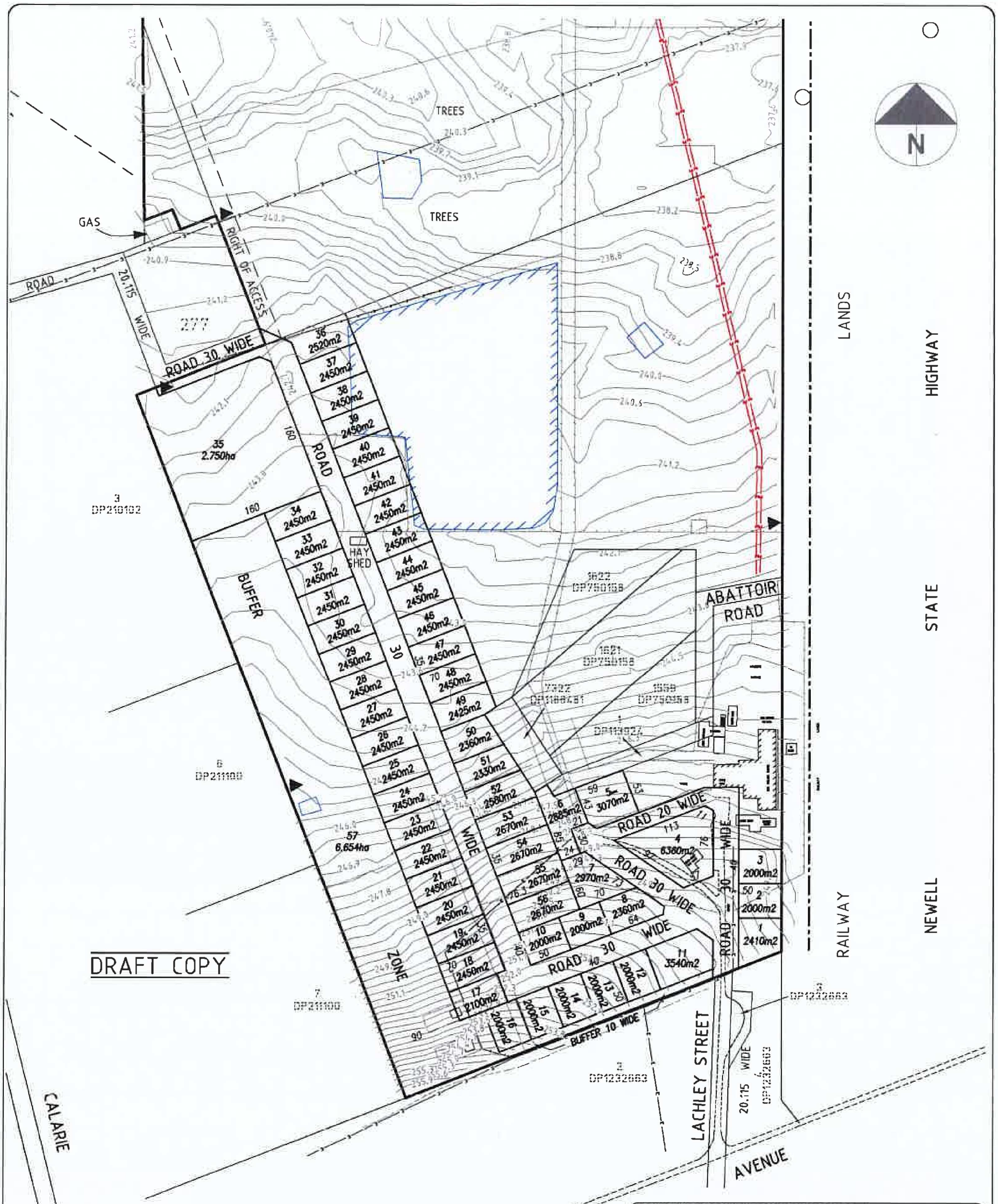
Crash Data


N
Legend
Crash Severity
Serious Injury
Moderate Injury
Minor / Other Injury
Non-casualty (towaway)
Year: 2021
RUM: 10 (Cross Traffic)
Crash ID: 1260943
Natural Lighting: Daylight
Newell Highway
Wyndham Avenue
Wyndham Avenue
Parkes Road
nearmap


N
Year: 2022
RUM: 10 (Cross Traffic)
Crash ID: 1293303
Natural Lighting: Daylight
Calarie Road
Wyndham Avenue
Wyndham Avenue
Calarie Road
Legend
Crash Severity
Serious Injury
Moderate Injury
Minor / Other Injury
Non-casualty (towaway)
nearmap

APPENDIX B

Reduced Plans



THE FOLLOWING NOTES FORM AN INTEGRAL PART OF THIS PLAN.

1. COPYRIGHT OF THE INFORMATION CONTAINED HEREIN IS RESERVED BY THE AUTHOR AND IS NOT TO BE USED WITHOUT THE EXPRESS PERMISSION OF THE AUTHOR. DO NOT SCALE.

2. THIS PLAN IS PREPARED FOR LACHLEY ESTATE FROM A COMBINATION OF FIELD SURVEY AND EXISTING RECORDS FOR THE PURPOSE OF DESIGNING NEW CONSTRUCTIONS ON THE LAND AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE. THE TITLE BOUNDARIES SHOWN HEREON WERE NOT MARKED BY THE AUTHOR AT THE TIME OF SURVEY. SERVICES SHOWN HAVE BEEN LOCATED WHERE POSSIBLE BY FIELD SURVEY. PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON THE SITE, THE RELEVANT AUTHORITIES SHOULD BE CONTACTED FOR POSSIBLE LOCATION OF FURTHER UNDERGROUND SERVICES AND DETAILED LOCATION OF ALL SERVICES.

KEY

DENOTES DAM

KARL LUPIS
REGISTERED SURVEYOR

7 JUNCTION STREET, FORBES.
P.O. BOX 258, FORBES 2871
PHONE: (02) 6852 2480

PLAN OF PROPOSED SUBDIVISION
UPON LACHLEY ESTATE SITE
FORBES

APPLICANT : LACHLEY ESTATE
OLD FORBES ABATTOIRS SITE

SCALE	DATE	REF.
1:4000(A3)	25/11/2024	24/068A

COUNTY: ASHBURNHAM	AZIMUTH: MGA 55
PARISH: FORBES	DATUM: AHD
L.G.A: FORBES	FILE: ENV 2/9

APPENDIX C

SIDRA Outputs

APPENDIX C-1

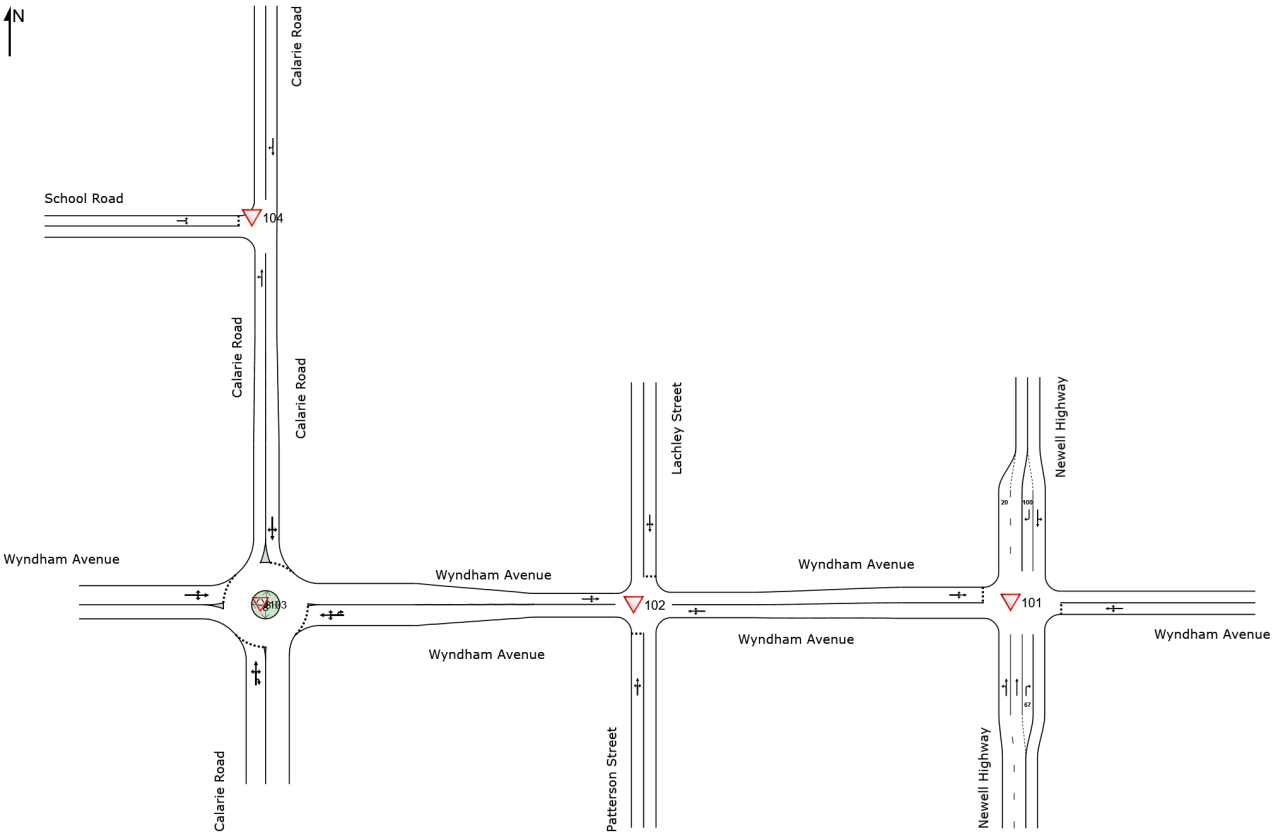
Existing Scenario – 2024

NETWORK LAYOUT

Network: N101 [2024 Base AM Peak (Network Folder: 2024 Base)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	101 - Wyndham Avenue / Newell Highway AM Peak (08:00 - 09:00)
102	NA	102 - Lachley Street / Wyndham Avenue / Patterson Street AM Peak (08:00 - 09:00)
103	NA	103 - Wyndham Avenue / Calarie Road AM Peak (08:00 - 09:00)
104	NA	104 - Calarie Road / School Road AM Peak (08:00 - 09:00)

MOVEMENT SUMMARY

Site: 101 [101 - Wyndham Avenue / Newell Highway AM Peak (08:00 - 09:00) (Site Folder: 2024 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2024 Base AM Peak (Network Folder: 2024 Base)]

Existing AM 2024
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Newell Highway															
1	L2	All MCs	39	0.0	39	0.0	0.026	7.0	LOS A	0.0	0.0	0.00	0.52	0.00	70.8
2	T1	All MCs	225	24.8	225	24.8	0.129	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	79.7
3	R2	All MCs	11	0.0	11	0.0	0.007	7.4	LOS A	0.0	0.2	0.34	0.59	0.34	60.2
Approach			275	20.3	275	20.3	0.129	1.3	NA	0.0	0.2	0.01	0.11	0.01	78.2
East: Wyndham Avenue															
4	L2	All MCs	11	10.0	11	10.0	0.040	5.8	LOS A	0.1	1.0	0.51	0.63	0.51	57.1
5	T1	All MCs	6	16.7	6	16.7	0.040	12.6	LOS A	0.1	1.0	0.51	0.63	0.51	38.4
6	R2	All MCs	3	0.0	3	0.0	0.040	13.0	LOS A	0.1	1.0	0.51	0.63	0.51	57.9
Approach			20	10.5	20	10.5	0.040	9.1	LOS A	0.1	1.0	0.51	0.63	0.51	54.1
North: Newell Highway															
7	L2	All MCs	4	75.0	4	75.0	0.135	8.4	LOS A	0.0	0.0	0.00	0.01	0.00	59.4
8	T1	All MCs	223	24.5	223	24.5	0.135	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	79.9
9	R2	All MCs	27	11.5	27	11.5	0.028	8.5	LOS A	0.1	0.8	0.38	0.63	0.38	67.6
Approach			255	24.0	255	24.0	0.135	1.1	NA	0.1	0.8	0.04	0.08	0.04	78.7
West: Wyndham Avenue															
10	L2	All MCs	47	2.2	47	2.2	0.128	5.1	LOS A	0.5	3.5	0.13	0.48	0.13	58.1
11	T1	All MCs	8	25.0	8	25.0	0.128	14.7	LOS B	0.5	3.5	0.13	0.48	0.13	42.8
12	R2	All MCs	22	0.0	22	0.0	0.128	13.8	LOS A	0.5	3.5	0.13	0.48	0.13	58.3
Approach			78	4.1	78	4.1	0.128	8.6	LOS A	0.5	3.5	0.13	0.48	0.13	56.8
All Vehicles			627	19.5	627	19.5	0.135	2.4	NA	0.5	3.5	0.06	0.16	0.06	75.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 201 [201 - Wyndham Avenue / Newell Highway PM Peak (16:00 - 17:00) (Site Folder: 2024 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2024 Base PM Peak (Network Folder: 2024 Base)]

Existing PM 2024
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Newell Highway															
1	L2	All MCs	32	10.0	32	10.0	0.023	7.1	LOS A	0.0	0.0	0.00	0.51	0.00	71.2
2	T1	All MCs	206	13.3	206	13.3	0.111	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	79.8
3	R2	All MCs	13	33.3	13	33.3	0.011	8.3	LOS A	0.0	0.4	0.36	0.60	0.36	59.5
Approach			251	13.9	251	13.9	0.111	1.4	NA	0.0	0.4	0.02	0.11	0.02	78.1
East: Wyndham Avenue															
4	L2	All MCs	22	9.5	22	9.5	0.056	5.7	LOS A	0.2	1.5	0.46	0.60	0.46	58.0
5	T1	All MCs	9	0.0	9	0.0	0.056	9.6	LOS A	0.2	1.5	0.46	0.60	0.46	39.8
6	R2	All MCs	3	33.3	3	33.3	0.056	16.2	LOS B	0.2	1.5	0.46	0.60	0.46	55.8
Approach			35	9.1	35	9.1	0.056	7.8	LOS A	0.2	1.5	0.46	0.60	0.46	55.3
North: Newell Highway															
7	L2	All MCs	4	0.0	4	0.0	0.127	7.0	LOS A	0.0	0.0	0.00	0.01	0.00	75.0
8	T1	All MCs	217	20.9	217	20.9	0.127	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	79.8
9	R2	All MCs	25	0.0	25	0.0	0.022	7.9	LOS A	0.1	0.6	0.34	0.61	0.34	67.8
Approach			246	18.4	246	18.4	0.127	1.0	NA	0.1	0.6	0.03	0.07	0.03	78.9
West: Wyndham Avenue															
10	L2	All MCs	20	0.0	20	0.0	0.116	5.0	LOS A	0.4	3.0	0.19	0.48	0.19	57.4
11	T1	All MCs	3	0.0	3	0.0	0.116	10.0	LOS A	0.4	3.0	0.19	0.48	0.19	42.2
12	R2	All MCs	34	0.0	34	0.0	0.116	12.8	LOS A	0.4	3.0	0.19	0.48	0.19	57.4
Approach			57	0.0	57	0.0	0.116	9.9	LOS A	0.4	3.0	0.19	0.48	0.19	56.7
All Vehicles			588	14.1	588	14.1	0.127	2.4	NA	0.4	3.0	0.07	0.16	0.07	75.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 [102 - Lachley Street / Wyndham Avenue / Patterson Street AM Peak (08:00 - 09:00) (Site Folder: 2024 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2024 Base AM Peak (Network Folder: 2024 Base)]

Existing AM 2024
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Patterson Street															
1	L2	All MCs	1	0.0	1	0.0	0.003	4.7	LOS A	0.0	0.1	0.21	0.48	0.21	44.1
2	T1	All MCs	1	0.0	1	0.0	0.003	3.8	LOS A	0.0	0.1	0.21	0.48	0.21	43.8
3	R2	All MCs	1	0.0	1	0.0	0.003	5.3	LOS A	0.0	0.1	0.21	0.48	0.21	44.1
Approach			3	0.0	3	0.0	0.003	4.6	LOS A	0.0	0.1	0.21	0.48	0.21	44.0
East: Wyndham Avenue															
4	L2	All MCs	1	0.0	1	0.0	0.038	4.6	LOS A	0.0	0.1	0.01	0.02	0.01	48.5
5	T1	All MCs	71	4.5	71	4.5	0.038	0.0	LOS A	0.0	0.1	0.01	0.02	0.01	49.7
6	R2	All MCs	1	0.0	1	0.0	0.038	4.6	LOS A	0.0	0.1	0.01	0.02	0.01	47.1
Approach			73	4.3	73	4.3	0.038	0.1	NA	0.0	0.1	0.01	0.02	0.01	49.6
North: Lachley Street															
7	L2	All MCs	1	0.0	1	0.0	0.003	4.8	LOS A	0.0	0.1	0.22	0.48	0.22	31.0
8	T1	All MCs	1	0.0	1	0.0	0.003	3.8	LOS A	0.0	0.1	0.22	0.48	0.22	43.7
9	R2	All MCs	1	0.0	1	0.0	0.003	5.3	LOS A	0.0	0.1	0.22	0.48	0.22	31.0
Approach			3	0.0	3	0.0	0.003	4.6	LOS A	0.0	0.1	0.22	0.48	0.22	39.4
West: Wyndham Avenue															
10	L2	All MCs	1	0.0	1	0.0	0.051	4.6	LOS A	0.0	0.1	0.01	0.01	0.01	48.4
11	T1	All MCs	93	5.7	93	5.7	0.051	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.9
12	R2	All MCs	1	0.0	1	0.0	0.051	4.6	LOS A	0.0	0.1	0.01	0.01	0.01	48.8
Approach			95	5.6	95	5.6	0.051	0.1	NA	0.0	0.1	0.01	0.01	0.01	49.8
All Vehicles			174	4.8	174	4.8	0.051	0.3	NA	0.0	0.1	0.01	0.03	0.01	49.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 202 [202 - Lachley Street / Wyndham Avenue / Patterson Street PM Peak (16:00 - 17:00) (Site Folder: 2024 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2024 Base PM Peak (Network Folder: 2024 Base)]

Existing PM 2024
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Patterson Street															
1	L2	All MCs	1	0.0	1	0.0	0.003	4.8	LOS A	0.0	0.1	0.20	0.48	0.20	44.2
2	T1	All MCs	1	0.0	1	0.0	0.003	3.7	LOS A	0.0	0.1	0.20	0.48	0.20	43.8
3	R2	All MCs	1	0.0	1	0.0	0.003	5.2	LOS A	0.0	0.1	0.20	0.48	0.20	44.2
Approach			3	0.0	3	0.0	0.003	4.5	LOS A	0.0	0.1	0.20	0.48	0.20	44.0
East: Wyndham Avenue															
4	L2	All MCs	1	0.0	1	0.0	0.040	4.6	LOS A	0.0	0.1	0.01	0.01	0.01	48.6
5	T1	All MCs	78	0.0	78	0.0	0.040	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.8
6	R2	All MCs	1	0.0	1	0.0	0.040	4.6	LOS A	0.0	0.1	0.01	0.01	0.01	47.2
Approach			80	0.0	80	0.0	0.040	0.1	NA	0.0	0.1	0.01	0.01	0.01	49.7
North: Lachley Street															
7	L2	All MCs	1	0.0	1	0.0	0.003	4.7	LOS A	0.0	0.1	0.19	0.48	0.19	31.3
8	T1	All MCs	1	0.0	1	0.0	0.003	3.7	LOS A	0.0	0.1	0.19	0.48	0.19	43.9
9	R2	All MCs	1	0.0	1	0.0	0.003	5.2	LOS A	0.0	0.1	0.19	0.48	0.19	31.3
Approach			3	0.0	3	0.0	0.003	4.5	LOS A	0.0	0.1	0.19	0.48	0.19	39.6
West: Wyndham Avenue															
10	L2	All MCs	1	0.0	1	0.0	0.034	4.6	LOS A	0.0	0.1	0.01	0.02	0.01	48.4
11	T1	All MCs	63	0.0	63	0.0	0.034	0.0	LOS A	0.0	0.1	0.01	0.02	0.01	49.8
12	R2	All MCs	1	0.0	1	0.0	0.034	4.6	LOS A	0.0	0.1	0.01	0.02	0.01	48.7
Approach			65	0.0	65	0.0	0.034	0.1	NA	0.0	0.1	0.01	0.02	0.01	49.8
All Vehicles			152	0.0	152	0.0	0.040	0.3	NA	0.0	0.1	0.01	0.04	0.01	49.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 103 [103 - Wyndham Avenue / Calarie Road AM Peak (08:00 - 09:00) (Site Folder: 2024 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2024 Base AM Peak (Network Folder: 2024 Base)]

Existing AM 2024
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	13	16.7	13	16.7	0.091	4.9	LOS A	0.3	2.4	0.11	0.58	0.11	43.9
2	T1	All MCs	23	27.3	23	27.3	0.091	4.1	LOS A	0.3	2.4	0.11	0.58	0.11	42.8
3	R2	All MCs	62	1.7	62	1.7	0.091	6.8	LOS A	0.3	2.4	0.11	0.58	0.11	42.8
3u	U	All MCs	9	77.8	9	77.8	0.091	9.1	LOS A	0.3	2.4	0.11	0.58	0.11	43.7
Approach			107	15.7	107	15.7	0.091	6.2	LOS A	0.3	2.4	0.11	0.58	0.11	43.1
East: Wyndham Avenue															
4	L2	All MCs	48	4.3	48	4.3	0.076	4.5	LOS A	0.2	1.6	0.16	0.53	0.16	46.1
5	T1	All MCs	21	5.0	21	5.0	0.076	4.1	LOS A	0.2	1.6	0.16	0.53	0.16	46.1
6	R2	All MCs	13	0.0	13	0.0	0.076	6.9	LOS A	0.2	1.6	0.16	0.53	0.16	45.5
6u	U	All MCs	5	0.0	5	0.0	0.076	8.4	LOS A	0.2	1.6	0.16	0.53	0.16	45.5
Approach			87	3.6	87	3.6	0.076	5.0	LOS A	0.2	1.6	0.16	0.53	0.16	46.0
North: Calarie Road															
7	L2	All MCs	15	7.1	15	7.1	0.073	4.8	LOS A	0.4	2.8	0.35	0.48	0.35	47.2
8	T1	All MCs	56	15.1	56	15.1	0.073	4.9	LOS A	0.4	2.8	0.35	0.48	0.35	47.4
9	R2	All MCs	1	0.0	1	0.0	0.073	7.6	LOS A	0.4	2.8	0.35	0.48	0.35	47.0
Approach			72	13.2	72	13.2	0.073	4.9	LOS A	0.4	2.8	0.35	0.48	0.35	47.4
West: Wyndham Avenue															
10	L2	All MCs	1	0.0	1	0.0	0.071	4.5	LOS A	0.2	1.7	0.20	0.49	0.20	42.3
11	T1	All MCs	60	0.0	60	0.0	0.071	4.0	LOS A	0.2	1.7	0.20	0.49	0.20	42.3
12	R2	All MCs	19	16.7	19	16.7	0.071	7.4	LOS A	0.2	1.7	0.20	0.49	0.20	44.6
Approach			80	3.9	80	3.9	0.071	4.8	LOS A	0.2	1.7	0.20	0.49	0.20	43.2
All Vehicles			346	9.4	346	9.4	0.091	5.3	LOS A	0.4	2.8	0.19	0.53	0.19	45.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 203 [203 - Wyndham Avenue / Calarie Road PM Peak (16:00 - 17:00) (Site Folder: 2024 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2024 Base PM Peak (Network Folder: 2024 Base)]

Existing PM 2024
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	11	0.0	11	0.0	0.064	4.8	LOS A	0.2	1.4	0.14	0.51	0.14	44.8
2	T1	All MCs	44	0.0	44	0.0	0.064	4.0	LOS A	0.2	1.4	0.14	0.51	0.14	43.8
3	R2	All MCs	21	0.0	21	0.0	0.064	6.9	LOS A	0.2	1.4	0.14	0.51	0.14	43.8
Approach			76	0.0	76	0.0	0.064	4.9	LOS A	0.2	1.4	0.14	0.51	0.14	44.0
East: Wyndham Avenue															
4	L2	All MCs	52	2.0	52	2.0	0.090	4.4	LOS A	0.3	1.8	0.10	0.51	0.10	46.4
5	T1	All MCs	43	0.0	43	0.0	0.090	3.9	LOS A	0.3	1.8	0.10	0.51	0.10	46.4
6	R2	All MCs	15	0.0	15	0.0	0.090	6.8	LOS A	0.3	1.8	0.10	0.51	0.10	45.8
6u	U	All MCs	3	0.0	3	0.0	0.090	8.2	LOS A	0.3	1.8	0.10	0.51	0.10	45.8
Approach			113	0.9	113	0.9	0.090	4.6	LOS A	0.3	1.8	0.10	0.51	0.10	46.3
North: Calarie Road															
7	L2	All MCs	12	0.0	12	0.0	0.040	4.0	LOS A	0.2	1.4	0.20	0.45	0.20	47.4
8	T1	All MCs	29	0.0	29	0.0	0.040	4.0	LOS A	0.2	1.4	0.20	0.45	0.20	47.7
9	R2	All MCs	5	20.0	5	20.0	0.040	7.3	LOS A	0.2	1.4	0.20	0.45	0.20	46.9
Approach			46	2.3	46	2.3	0.040	4.4	LOS A	0.2	1.4	0.20	0.45	0.20	47.5
West: Wyndham Avenue															
10	L2	All MCs	1	0.0	1	0.0	0.033	4.3	LOS A	0.1	0.8	0.16	0.51	0.16	42.0
11	T1	All MCs	23	0.0	23	0.0	0.033	3.9	LOS A	0.1	0.8	0.16	0.51	0.16	42.0
12	R2	All MCs	15	0.0	15	0.0	0.033	7.0	LOS A	0.1	0.8	0.16	0.51	0.16	44.7
Approach			39	0.0	39	0.0	0.033	5.1	LOS A	0.1	0.8	0.16	0.51	0.16	43.5
All Vehicles			274	0.8	274	0.8	0.090	4.7	LOS A	0.3	1.8	0.14	0.50	0.14	46.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 104 [104 - Calarie Road / School Road AM Peak (08:00 - 09:00) (Site Folder: 2024 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2024 Base AM Peak (Network Folder: 2024 Base)]

Existing AM 2024
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	1	0.0	1	0.0	0.013	7.0	LOS A	0.0	0.0	0.00	0.03	0.00	75.8
2	T1	All MCs	22	14.3	22	14.3	0.013	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	79.6
Approach			23	13.6	23	13.6	0.013	0.3	NA	0.0	0.0	0.00	0.03	0.00	79.4
North: Calarie Road															
8	T1	All MCs	36	5.9	36	5.9	0.024	0.0	LOS A	0.0	0.3	0.03	0.11	0.03	76.0
9	R2	All MCs	7	14.3	7	14.3	0.024	6.9	LOS A	0.0	0.3	0.03	0.11	0.03	57.9
Approach			43	7.3	43	7.3	0.024	1.2	NA	0.0	0.3	0.03	0.11	0.03	69.7
West: School Road															
10	L2	All MCs	6	16.7	6	16.7	0.005	4.8	LOS A	0.0	0.2	0.09	0.50	0.09	49.8
12	R2	All MCs	1	0.0	1	0.0	0.005	4.8	LOS A	0.0	0.2	0.09	0.50	0.09	44.2
Approach			7	14.3	7	14.3	0.005	4.8	LOS A	0.0	0.2	0.09	0.50	0.09	49.3
All Vehicles			74	10.0	74	10.0	0.024	1.3	NA	0.0	0.3	0.03	0.13	0.03	71.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 204 [204 - Calarie Road / School Road PM Peak (16:00 - 17:00) (Site Folder: 2024 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2024 Base PM Peak (Network Folder: 2024 Base)]

Existing PM 2024
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	4	0.0	4	0.0	0.019	7.0	LOS A	0.0	0.0	0.00	0.08	0.00	75.4
2	T1	All MCs	32	0.0	32	0.0	0.019	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	79.2
Approach			36	0.0	36	0.0	0.019	0.8	NA	0.0	0.0	0.00	0.08	0.00	78.7
North: Calarie Road															
8	T1	All MCs	29	0.0	29	0.0	0.020	0.0	LOS A	0.0	0.3	0.05	0.13	0.05	75.4
9	R2	All MCs	7	14.3	7	14.3	0.020	7.0	LOS A	0.0	0.3	0.05	0.13	0.05	57.7
Approach			37	2.9	37	2.9	0.020	1.4	NA	0.0	0.3	0.05	0.13	0.05	68.5
West: School Road															
10	L2	All MCs	9	0.0	9	0.0	0.007	4.6	LOS A	0.0	0.2	0.10	0.50	0.10	53.3
12	R2	All MCs	1	0.0	1	0.0	0.007	4.8	LOS A	0.0	0.2	0.10	0.50	0.10	44.1
Approach			11	0.0	11	0.0	0.007	4.7	LOS A	0.0	0.2	0.10	0.50	0.10	52.8
All Vehicles			83	1.3	83	1.3	0.020	1.6	NA	0.0	0.3	0.03	0.16	0.03	72.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

APPENDIX C-2

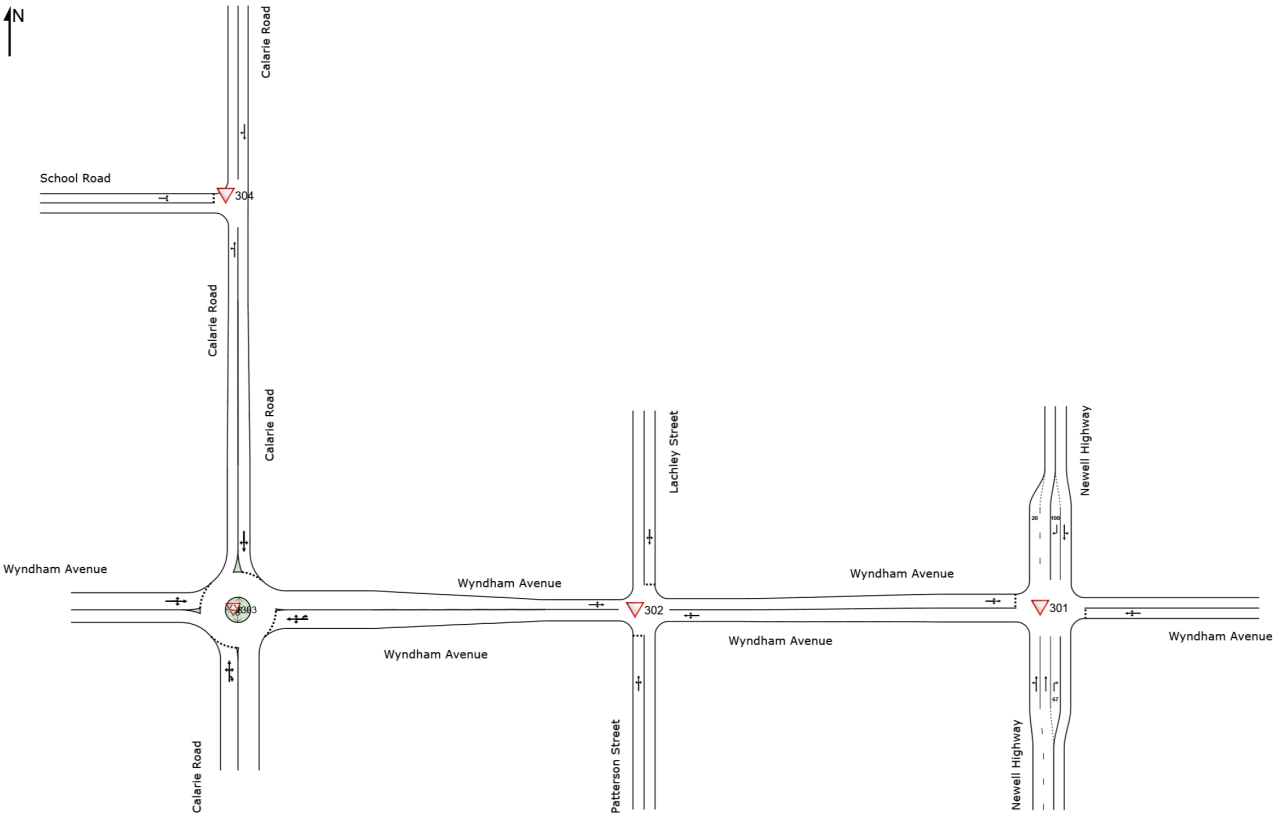
Base Case – 2028

NETWORK LAYOUT

Network: N101 [2028 Base AM Peak (Network Folder: 2028 Base)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
301	NA	301 - Wyndham Avenue / Newell Highway AM Peak (08:00 - 09:00)
302	NA	302 - Lachley Street / Wyndham Avenue / Patterson Street AM Peak (08:00 - 09:00)
303	NA	303 - Wyndham Avenue / Calarie Road AM Peak (08:00 - 09:00)
304	NA	304 - Calarie Road / School Road AM Peak (08:00 - 09:00)

MOVEMENT SUMMARY

Site: 301 [301 - Wyndham Avenue / Newell Highway AM Peak (08:00 - 09:00) (Site Folder: 2028 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base AM Peak (Network Folder: 2028 Base)]

Base AM 2028
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Newell Highway															
1	L2	All MCs	56	5.6	56	5.6	0.031	7.1	LOS A	0.0	0.0	0.00	0.63	0.00	69.4
2	T1	All MCs	238	24.8	238	24.8	0.142	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
3	R2	All MCs	11	0.0	11	0.0	0.008	7.5	LOS A	0.0	0.2	0.36	0.59	0.36	60.2
Approach			306	20.4	306	20.4	0.142	1.6	NA	0.0	0.2	0.01	0.14	0.01	78.0
East: Wyndham Avenue															
4	L2	All MCs	11	10.0	11	10.0	0.049	6.0	LOS A	0.2	1.2	0.56	0.67	0.56	56.2
5	T1	All MCs	7	16.7	7	16.7	0.049	15.7	LOS B	0.2	1.2	0.56	0.67	0.56	37.0
6	R2	All MCs	3	0.0	3	0.0	0.049	15.4	LOS B	0.2	1.2	0.56	0.67	0.56	57.0
Approach			21	10.5	21	10.5	0.049	10.5	LOS A	0.2	1.2	0.56	0.67	0.56	53.1
North: Newell Highway															
7	L2	All MCs	4	75.0	4	75.0	0.152	8.4	LOS A	0.0	0.0	0.00	0.01	0.00	59.4
8	T1	All MCs	252	24.7	252	24.7	0.152	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	79.9
9	R2	All MCs	63	17.1	63	17.1	0.068	9.0	LOS A	0.3	2.1	0.42	0.67	0.42	67.3
Approach			319	23.9	319	23.9	0.152	1.9	NA	0.3	2.1	0.08	0.14	0.08	78.0
West: Wyndham Avenue															
10	L2	All MCs	50	2.2	50	2.2	0.155	5.1	LOS A	0.4	3.2	0.01	0.51	0.01	60.7
11	T1	All MCs	9	25.0	9	25.0	0.155	4.0	LOS A	0.4	3.2	0.01	0.51	0.01	45.2
12	R2	All MCs	23	0.0	23	0.0	0.155	4.7	LOS A	0.4	3.2	0.01	0.51	0.01	60.9
Approach			82	4.1	82	4.1	0.155	4.8	LOS A	0.4	3.2	0.01	0.51	0.01	59.4
All Vehicles			728	19.8	728	19.8	0.155	2.4	NA	0.4	3.2	0.06	0.20	0.06	75.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 401 [401 - Wyndham Avenue / Newell Highway PM Peak (16:00 - 17:00) (Site Folder: 2028 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base PM Peak (Network Folder: 2028 Base)]

Base PM 2028
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Newell Highway															
1	L2	All MCs	48	31.0	48	31.0	0.030	7.5	LOS A	0.0	0.0	0.00	0.63	0.00	69.4
2	T1	All MCs	218	13.3	218	13.3	0.122	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
3	R2	All MCs	13	33.3	13	33.3	0.012	8.5	LOS A	0.0	0.4	0.39	0.61	0.39	59.5
Approach			280	17.3	280	17.3	0.122	1.7	NA	0.0	0.4	0.02	0.14	0.02	77.8
East: Wyndham Avenue															
4	L2	All MCs	23	9.5	23	9.5	0.068	5.9	LOS A	0.2	1.8	0.51	0.64	0.51	57.3
5	T1	All MCs	10	0.0	10	0.0	0.068	11.8	LOS A	0.2	1.8	0.51	0.64	0.51	38.7
6	R2	All MCs	3	33.3	3	33.3	0.068	20.1	LOS B	0.2	1.8	0.51	0.64	0.51	55.2
Approach			37	9.1	37	9.1	0.068	8.8	LOS A	0.2	1.8	0.51	0.64	0.51	54.5
North: Newell Highway															
7	L2	All MCs	4	0.0	4	0.0	0.145	7.0	LOS A	0.0	0.0	0.00	0.01	0.00	75.0
8	T1	All MCs	245	24.3	245	24.3	0.145	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	79.8
9	R2	All MCs	60	43.6	60	43.6	0.074	9.6	LOS A	0.3	2.6	0.41	0.66	0.41	67.0
Approach			310	27.7	310	27.7	0.145	2.0	NA	0.3	2.6	0.08	0.14	0.08	78.1
West: Wyndham Avenue															
10	L2	All MCs	21	0.0	21	0.0	0.144	4.9	LOS A	0.5	3.4	0.02	0.51	0.02	60.7
11	T1	All MCs	3	0.0	3	0.0	0.144	3.9	LOS A	0.5	3.4	0.02	0.51	0.02	45.4
12	R2	All MCs	36	0.0	36	0.0	0.144	4.9	LOS A	0.5	3.4	0.02	0.51	0.02	60.8
Approach			60	0.0	60	0.0	0.144	4.9	LOS A	0.5	3.4	0.02	0.51	0.02	60.1
All Vehicles			687	20.0	687	20.0	0.145	2.5	NA	0.5	3.4	0.07	0.20	0.07	75.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 302 [302 - Lachley Street / Wyndham Avenue / Patterson Street AM Peak (08:00 - 09:00) (Site Folder: 2028 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base AM Peak (Network Folder: 2028 Base)]

Base AM 2028
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Patterson Street															
1	L2	All MCs	1	0.0	1	0.0	0.003	4.8	LOS A	0.0	0.1	0.21	0.48	0.21	44.1
2	T1	All MCs	1	0.0	1	0.0	0.003	3.8	LOS A	0.0	0.1	0.21	0.48	0.21	43.8
3	R2	All MCs	1	0.0	1	0.0	0.003	5.3	LOS A	0.0	0.1	0.21	0.48	0.21	44.1
Approach			3	0.0	3	0.0	0.003	4.6	LOS A	0.0	0.1	0.21	0.48	0.21	44.0
East: Wyndham Avenue															
4	L2	All MCs	1	0.0	1	0.0	0.040	4.6	LOS A	0.0	0.1	0.01	0.02	0.01	48.5
5	T1	All MCs	75	4.5	75	4.5	0.040	0.0	LOS A	0.0	0.1	0.01	0.02	0.01	49.7
6	R2	All MCs	1	0.0	1	0.0	0.040	4.6	LOS A	0.0	0.1	0.01	0.02	0.01	47.1
Approach			77	4.3	77	4.3	0.040	0.1	NA	0.0	0.1	0.01	0.02	0.01	49.6
North: Lachley Street															
7	L2	All MCs	1	0.0	1	0.0	0.003	4.8	LOS A	0.0	0.1	0.23	0.48	0.23	30.9
8	T1	All MCs	1	0.0	1	0.0	0.003	3.8	LOS A	0.0	0.1	0.23	0.48	0.23	43.7
9	R2	All MCs	1	0.0	1	0.0	0.003	5.3	LOS A	0.0	0.1	0.23	0.48	0.23	30.9
Approach			3	0.0	3	0.0	0.003	4.7	LOS A	0.0	0.1	0.23	0.48	0.23	39.4
West: Wyndham Avenue															
10	L2	All MCs	1	0.0	1	0.0	0.054	4.6	LOS A	0.0	0.1	0.01	0.01	0.01	48.4
11	T1	All MCs	98	5.7	98	5.7	0.054	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.9
12	R2	All MCs	1	0.0	1	0.0	0.054	4.6	LOS A	0.0	0.1	0.01	0.01	0.01	48.8
Approach			100	5.6	100	5.6	0.054	0.1	NA	0.0	0.1	0.01	0.01	0.01	49.8
All Vehicles			184	4.8	184	4.8	0.054	0.3	NA	0.0	0.1	0.01	0.03	0.01	49.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 402 [402 - Lachley Street / Wyndham Avenue / Patterson Street PM Peak (16:00 - 17:00) (Site Folder: 2028 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base PM Peak (Network Folder: 2028 Base)]

Base PM 2028
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Patterson Street															
1	L2	All MCs	1	0.0	1	0.0	0.003	4.8	LOS A	0.0	0.1	0.21	0.48	0.21	44.1
2	T1	All MCs	1	0.0	1	0.0	0.003	3.7	LOS A	0.0	0.1	0.21	0.48	0.21	43.8
3	R2	All MCs	1	0.0	1	0.0	0.003	5.2	LOS A	0.0	0.1	0.21	0.48	0.21	44.1
Approach			3	0.0	3	0.0	0.003	4.6	LOS A	0.0	0.1	0.21	0.48	0.21	44.0
East: Wyndham Avenue															
4	L2	All MCs	1	0.0	1	0.0	0.043	4.6	LOS A	0.0	0.1	0.01	0.01	0.01	48.6
5	T1	All MCs	82	0.0	82	0.0	0.043	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.8
6	R2	All MCs	1	0.0	1	0.0	0.043	4.6	LOS A	0.0	0.1	0.01	0.01	0.01	47.2
Approach			85	0.0	85	0.0	0.043	0.1	NA	0.0	0.1	0.01	0.01	0.01	49.7
North: Lachley Street															
7	L2	All MCs	1	0.0	1	0.0	0.003	4.7	LOS A	0.0	0.1	0.20	0.48	0.20	31.2
8	T1	All MCs	1	0.0	1	0.0	0.003	3.7	LOS A	0.0	0.1	0.20	0.48	0.20	43.8
9	R2	All MCs	1	0.0	1	0.0	0.003	5.2	LOS A	0.0	0.1	0.20	0.48	0.20	31.2
Approach			3	0.0	3	0.0	0.003	4.6	LOS A	0.0	0.1	0.20	0.48	0.20	39.6
West: Wyndham Avenue															
10	L2	All MCs	1	0.0	1	0.0	0.036	4.6	LOS A	0.0	0.1	0.01	0.02	0.01	48.4
11	T1	All MCs	67	0.0	67	0.0	0.036	0.0	LOS A	0.0	0.1	0.01	0.02	0.01	49.8
12	R2	All MCs	1	0.0	1	0.0	0.036	4.6	LOS A	0.0	0.1	0.01	0.02	0.01	48.7
Approach			69	0.0	69	0.0	0.036	0.1	NA	0.0	0.1	0.01	0.02	0.01	49.8
All Vehicles			160	0.0	160	0.0	0.043	0.3	NA	0.0	0.1	0.02	0.04	0.02	49.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 303 [303 - Wyndham Avenue / Calarie Road AM Peak (08:00 - 09:00) (Site Folder: 2028 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base AM Peak (Network Folder: 2028 Base)]

Base AM 2028
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	13	16.7	13	16.7	0.096	4.9	LOS A	0.3	2.6	0.11	0.58	0.11	43.9
2	T1	All MCs	25	27.3	25	27.3	0.096	4.1	LOS A	0.3	2.6	0.11	0.58	0.11	42.8
3	R2	All MCs	66	1.7	66	1.7	0.096	6.8	LOS A	0.3	2.6	0.11	0.58	0.11	42.8
3u	U	All MCs	10	77.8	10	77.8	0.096	9.1	LOS A	0.3	2.6	0.11	0.58	0.11	43.6
Approach			114	15.7	114	15.7	0.096	6.2	LOS A	0.3	2.6	0.11	0.58	0.11	43.1
East: Wyndham Avenue															
4	L2	All MCs	51	4.3	51	4.3	0.080	4.6	LOS A	0.2	1.8	0.16	0.53	0.16	46.1
5	T1	All MCs	22	5.0	22	5.0	0.080	4.1	LOS A	0.2	1.8	0.16	0.53	0.16	46.1
6	R2	All MCs	13	0.0	13	0.0	0.080	6.9	LOS A	0.2	1.8	0.16	0.53	0.16	45.5
6u	U	All MCs	6	0.0	6	0.0	0.080	8.4	LOS A	0.2	1.8	0.16	0.53	0.16	45.5
Approach			92	3.6	92	3.6	0.080	5.0	LOS A	0.2	1.8	0.16	0.53	0.16	46.0
North: Calarie Road															
7	L2	All MCs	16	7.1	16	7.1	0.078	4.8	LOS A	0.4	3.0	0.36	0.49	0.36	47.1
8	T1	All MCs	59	15.1	59	15.1	0.078	5.0	LOS A	0.4	3.0	0.36	0.49	0.36	47.4
9	R2	All MCs	1	0.0	1	0.0	0.078	7.7	LOS A	0.4	3.0	0.36	0.49	0.36	46.9
Approach			76	13.2	76	13.2	0.078	5.0	LOS A	0.4	3.0	0.36	0.49	0.36	47.3
West: Wyndham Avenue															
10	L2	All MCs	1	0.0	1	0.0	0.076	4.5	LOS A	0.3	1.9	0.21	0.49	0.21	42.3
11	T1	All MCs	64	0.0	64	0.0	0.076	4.0	LOS A	0.3	1.9	0.21	0.49	0.21	42.3
12	R2	All MCs	20	16.7	20	16.7	0.076	7.4	LOS A	0.3	1.9	0.21	0.49	0.21	44.6
Approach			85	3.9	85	3.9	0.076	4.8	LOS A	0.3	1.9	0.21	0.49	0.21	43.2
All Vehicles			367	9.4	367	9.4	0.096	5.3	LOS A	0.4	3.0	0.20	0.53	0.20	45.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 403 [403 - Wyndham Avenue / Calarie Road PM Peak (16:00 - 17:00) (Site Folder: 2028 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base PM Peak (Network Folder: 2028 Base)]

Base PM 2028
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	11	0.0	11	0.0	0.068	4.8	LOS A	0.2	1.5	0.14	0.51	0.14	44.8
2	T1	All MCs	47	0.0	47	0.0	0.068	4.0	LOS A	0.2	1.5	0.14	0.51	0.14	43.8
3	R2	All MCs	22	0.0	22	0.0	0.068	6.9	LOS A	0.2	1.5	0.14	0.51	0.14	43.8
Approach			80	0.0	80	0.0	0.068	4.9	LOS A	0.2	1.5	0.14	0.51	0.14	44.0
East: Wyndham Avenue															
4	L2	All MCs	55	2.0	55	2.0	0.095	4.4	LOS A	0.3	2.0	0.11	0.51	0.11	46.4
5	T1	All MCs	46	0.0	46	0.0	0.095	3.9	LOS A	0.3	2.0	0.11	0.51	0.11	46.4
6	R2	All MCs	16	0.0	16	0.0	0.095	6.8	LOS A	0.3	2.0	0.11	0.51	0.11	45.8
6u	U	All MCs	3	0.0	3	0.0	0.095	8.2	LOS A	0.3	2.0	0.11	0.51	0.11	45.8
Approach			119	0.9	119	0.9	0.095	4.6	LOS A	0.3	2.0	0.11	0.51	0.11	46.3
North: Calarie Road															
7	L2	All MCs	12	0.0	12	0.0	0.043	4.1	LOS A	0.2	1.5	0.21	0.46	0.21	47.4
8	T1	All MCs	31	0.0	31	0.0	0.043	4.0	LOS A	0.2	1.5	0.21	0.46	0.21	47.7
9	R2	All MCs	6	20.0	6	20.0	0.043	7.3	LOS A	0.2	1.5	0.21	0.46	0.21	46.9
Approach			49	2.3	49	2.3	0.043	4.4	LOS A	0.2	1.5	0.21	0.46	0.21	47.5
West: Wyndham Avenue															
10	L2	All MCs	1	0.0	1	0.0	0.035	4.3	LOS A	0.1	0.8	0.16	0.51	0.16	42.0
11	T1	All MCs	25	0.0	25	0.0	0.035	3.9	LOS A	0.1	0.8	0.16	0.51	0.16	42.0
12	R2	All MCs	16	0.0	16	0.0	0.035	7.0	LOS A	0.1	0.8	0.16	0.51	0.16	44.7
Approach			41	0.0	41	0.0	0.035	5.1	LOS A	0.1	0.8	0.16	0.51	0.16	43.5
All Vehicles			290	0.8	290	0.8	0.095	4.7	LOS A	0.3	2.0	0.14	0.50	0.14	46.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 304 [304 - Calarie Road / School Road AM Peak (08:00 - 09:00) (Site Folder: 2028 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base AM Peak (Network Folder: 2028 Base)]

Base AM 2028
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	1	0.0	1	0.0	0.014	7.0	LOS A	0.0	0.0	0.00	0.03	0.00	75.8
2	T1	All MCs	23	14.3	23	14.3	0.014	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	79.6
Approach			25	13.6	25	13.6	0.014	0.3	NA	0.0	0.0	0.00	0.03	0.00	79.4
North: Calarie Road															
8	T1	All MCs	38	5.9	38	5.9	0.025	0.0	LOS A	0.0	0.4	0.04	0.11	0.04	76.0
9	R2	All MCs	8	14.3	8	14.3	0.025	6.9	LOS A	0.0	0.4	0.04	0.11	0.04	57.9
Approach			46	7.3	46	7.3	0.025	1.2	NA	0.0	0.4	0.04	0.11	0.04	69.7
West: School Road															
10	L2	All MCs	7	16.7	7	16.7	0.005	4.8	LOS A	0.0	0.2	0.09	0.50	0.09	49.8
12	R2	All MCs	1	0.0	1	0.0	0.005	4.8	LOS A	0.0	0.2	0.09	0.50	0.09	44.1
Approach			8	14.3	8	14.3	0.005	4.8	LOS A	0.0	0.2	0.09	0.50	0.09	49.3
All Vehicles			78	10.0	78	10.0	0.025	1.3	NA	0.0	0.4	0.03	0.13	0.03	71.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 404 [404 - Calarie Road / School Road PM Peak (16:00 - 17:00) (Site Folder: 2028 Base)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base PM Peak (Network Folder: 2028 Base)]

Base PM 2028
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	4	0.0	4	0.0	0.020	7.0	LOS A	0.0	0.0	0.00	0.08	0.00	75.4
2	T1	All MCs	33	0.0	33	0.0	0.020	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	79.2
Approach			38	0.0	38	0.0	0.020	0.8	NA	0.0	0.0	0.00	0.08	0.00	78.7
North: Calarie Road															
8	T1	All MCs	31	0.0	31	0.0	0.021	0.0	LOS A	0.0	0.3	0.05	0.13	0.05	75.4
9	R2	All MCs	8	14.3	8	14.3	0.021	7.0	LOS A	0.0	0.3	0.05	0.13	0.05	57.7
Approach			39	2.9	39	2.9	0.021	1.4	NA	0.0	0.3	0.05	0.13	0.05	68.4
West: School Road															
10	L2	All MCs	10	0.0	10	0.0	0.007	4.6	LOS A	0.0	0.2	0.10	0.50	0.10	53.3
12	R2	All MCs	1	0.0	1	0.0	0.007	4.8	LOS A	0.0	0.2	0.10	0.50	0.10	44.1
Approach			11	0.0	11	0.0	0.007	4.7	LOS A	0.0	0.2	0.10	0.50	0.10	52.7
All Vehicles			88	1.3	88	1.3	0.021	1.6	NA	0.0	0.3	0.04	0.16	0.04	72.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

APPENDIX C-3

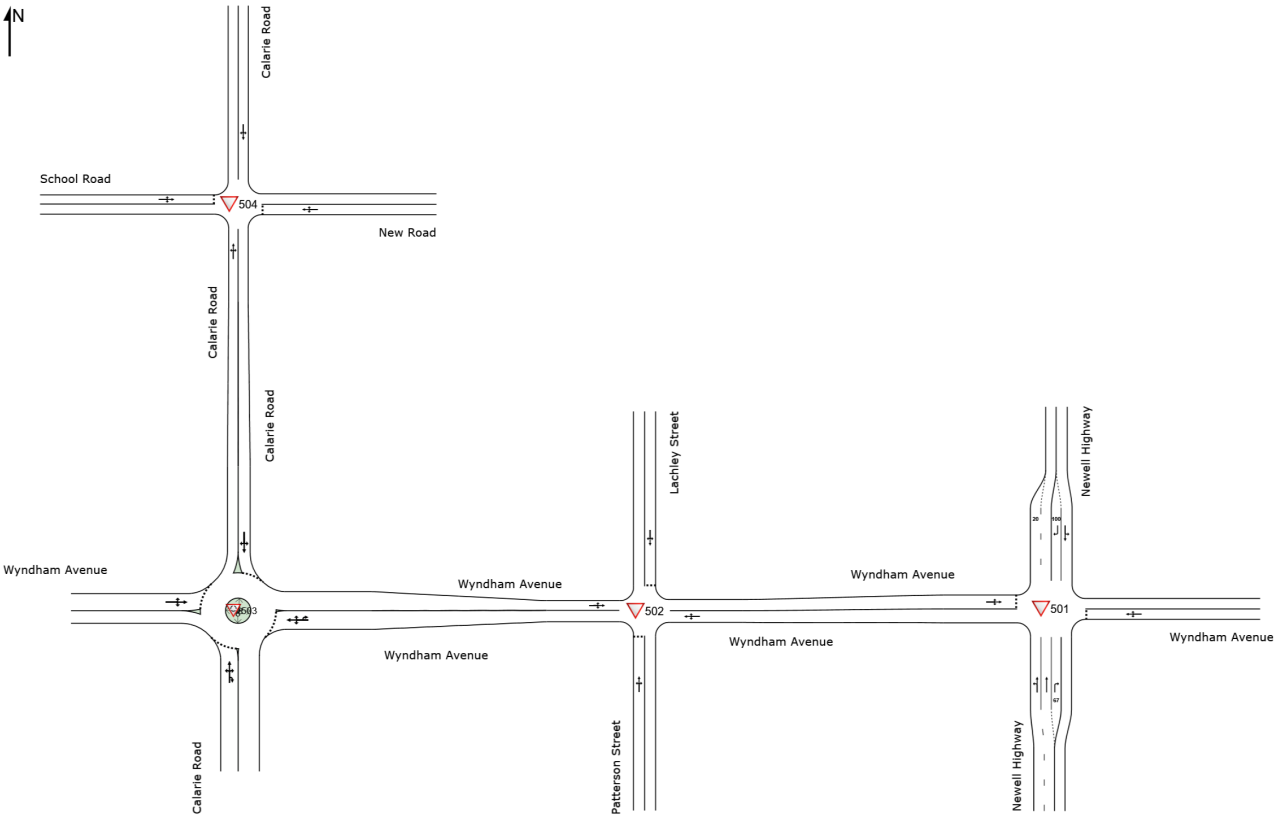
Base Case + Development – 2028

NETWORK LAYOUT

Network: N101 [2028 Base + Development AM Peak (Network Folder: 2028 Base + Development)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
▽501	NA	501 - Wyndham Avenue / Newell Highway AM Peak (08:00 - 09:00)
▽502	NA	502 - Lachley Street / Wyndham Avenue / Patterson Street AM Peak (08:00 - 09:00)
▽503	NA	503 - Wyndham Avenue / Calarie Road AM Peak (08:00 - 09:00)
▽504	NA	504 - Calarie Road / School Road AM Peak (08:00 - 09:00)

Organisation: TRAFFIX PTY LTD | Licence: NETWORK / 1PC | Created: Tuesday, 19 November 2024 8:45:25 PM
Project: T:\Synergy\Projects\24\24.242\Modelling\24.242m02v01 TRAFFIX_1 Lachley Street, Forbes.sip9

MOVEMENT SUMMARY

Site: 501 [501 - Wyndham Avenue / Newell Highway AM Peak (08:00 - 09:00) (Site Folder: 2028 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base + Development AM Peak (Network Folder: 2028 Base + Development)]

Base + Development AM 2028
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Newell Highway															
1	L2	All MCs	170	20.5	170	20.5	0.105	6.3	LOS A	0.0	0.0	0.00	0.59	0.00	59.0
2	T1	All MCs	238	24.8	238	24.8	0.142	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
3	R2	All MCs	11	0.0	11	0.0	0.008	7.5	LOS A	0.0	0.2	0.36	0.59	0.36	60.2
Approach			419	22.4	419	22.4	0.142	2.8	NA	0.0	0.2	0.01	0.26	0.01	72.7
East: Wyndham Avenue															
4	L2	All MCs	11	10.0	11	10.0	0.060	6.0	LOS A	0.2	1.5	0.61	0.70	0.61	54.9
5	T1	All MCs	7	16.7	7	16.7	0.060	21.6	LOS B	0.2	1.5	0.61	0.70	0.61	35.3
6	R2	All MCs	3	0.0	3	0.0	0.060	16.6	LOS B	0.2	1.5	0.61	0.70	0.61	55.7
Approach			21	10.5	21	10.5	0.060	12.6	LOS A	0.2	1.5	0.61	0.70	0.61	51.6
North: Newell Highway															
7	L2	All MCs	4	75.0	4	75.0	0.152	8.4	LOS A	0.0	0.0	0.00	0.01	0.00	59.4
8	T1	All MCs	252	24.7	252	24.7	0.152	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	79.9
9	R2	All MCs	91	21.0	91	21.0	0.120	9.8	LOS A	0.5	3.8	0.51	0.74	0.51	61.9
Approach			348	24.3	348	24.3	0.152	2.7	NA	0.5	3.8	0.13	0.20	0.13	76.2
West: Wyndham Avenue															
10	L2	All MCs	58	5.6	58	5.6	0.378	5.2	LOS A	1.5	11.8	0.02	0.52	0.02	60.2
11	T1	All MCs	9	25.0	9	25.0	0.378	4.6	LOS A	1.5	11.8	0.02	0.52	0.02	45.9
12	R2	All MCs	52	16.3	52	16.3	0.378	6.1	LOS A	1.5	11.8	0.02	0.52	0.02	56.6
Approach			118	11.7	118	11.7	0.378	5.6	LOS A	1.5	11.8	0.02	0.52	0.02	57.7
All Vehicles			906	21.5	906	21.5	0.378	3.4	NA	1.5	11.8	0.07	0.28	0.07	71.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 601 [601 - Wyndham Avenue / Newell Highway PM Peak (16:00 - 17:00) (Site Folder: 2028 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base + Development PM Peak (Network Folder: 2028 Base + Development)]

Base + Development PM 2028
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Newell Highway															
1	L2	All MCs	80	30.6	80	30.6	0.051	6.8	LOS A	0.0	0.0	0.00	0.61	0.00	62.9
2	T1	All MCs	218	13.3	218	13.3	0.122	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
3	R2	All MCs	13	33.3	13	33.3	0.011	8.4	LOS A	0.0	0.4	0.38	0.61	0.38	59.5
Approach			311	18.6	311	18.6	0.122	2.1	NA	0.0	0.4	0.02	0.18	0.02	75.9
East: Wyndham Avenue															
4	L2	All MCs	23	9.5	23	9.5	0.063	5.8	LOS A	0.2	1.6	0.50	0.63	0.50	57.6
5	T1	All MCs	10	0.0	10	0.0	0.063	10.9	LOS A	0.2	1.6	0.50	0.63	0.50	39.2
6	R2	All MCs	3	33.3	3	33.3	0.063	18.7	LOS B	0.2	1.6	0.50	0.63	0.50	55.4
Approach			37	9.1	37	9.1	0.063	8.4	LOS A	0.2	1.6	0.50	0.63	0.50	54.8
North: Newell Highway															
7	L2	All MCs	4	0.0	4	0.0	0.145	7.0	LOS A	0.0	0.0	0.00	0.01	0.00	75.0
8	T1	All MCs	245	24.3	245	24.3	0.145	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	79.8
9	R2	All MCs	68	41.9	68	41.9	0.081	9.5	LOS A	0.3	2.8	0.43	0.67	0.43	65.5
Approach			318	27.7	318	27.7	0.145	2.2	NA	0.3	2.8	0.09	0.15	0.09	77.7
West: Wyndham Avenue															
10	L2	All MCs	54	17.6	54	17.6	0.702	5.8	LOS A	6.5	53.5	0.07	0.52	0.07	56.1
11	T1	All MCs	3	0.0	3	0.0	0.702	5.0	LOS A	6.5	53.5	0.07	0.52	0.07	46.4
12	R2	All MCs	164	21.8	164	21.8	0.702	8.2	LOS A	6.5	53.5	0.07	0.52	0.07	54.6
Approach			221	20.5	221	20.5	0.702	7.6	LOS A	6.5	53.5	0.07	0.52	0.07	54.8
All Vehicles			887	21.9	887	21.9	0.702	3.8	NA	6.5	53.5	0.08	0.27	0.08	70.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 502 [502 - Lachley Street / Wyndham Avenue / Patterson Street AM Peak (08:00 - 09:00) (Site Folder: 2028 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base + Development AM Peak (Network Folder: 2028 Base + Development)]

Base + Development AM 2028
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Patterson Street															
1	L2	All MCs	1	0.0	1	0.0	0.003	4.8	LOS A	0.0	0.1	0.28	0.48	0.28	43.7
2	T1	All MCs	1	0.0	1	0.0	0.003	4.7	LOS A	0.0	0.1	0.28	0.48	0.28	43.4
3	R2	All MCs	1	0.0	1	0.0	0.003	6.5	LOS A	0.0	0.1	0.28	0.48	0.28	43.7
Approach			3	0.0	3	0.0	0.003	5.3	LOS A	0.0	0.1	0.28	0.48	0.28	43.6
East: Wyndham Avenue															
4	L2	All MCs	1	0.0	1	0.0	0.149	5.2	LOS A	0.8	6.2	0.27	0.43	0.27	47.8
5	T1	All MCs	75	4.5	75	4.5	0.149	0.5	LOS A	0.8	6.2	0.27	0.43	0.27	48.0
6	R2	All MCs	143	27.9	143	27.9	0.149	6.4	LOS A	0.8	6.2	0.27	0.43	0.27	25.8
Approach			219	19.8	219	19.8	0.149	4.4	NA	0.8	6.2	0.27	0.43	0.27	30.1
North: Lachley Street															
7	L2	All MCs	37	28.5	37	28.5	0.041	6.0	LOS A	0.2	1.3	0.23	0.54	0.23	31.0
8	T1	All MCs	1	0.0	1	0.0	0.041	4.7	LOS A	0.2	1.3	0.23	0.54	0.23	43.7
9	R2	All MCs	8	0.0	8	0.0	0.041	7.3	LOS A	0.2	1.3	0.23	0.54	0.23	31.0
Approach			47	22.6	47	22.6	0.041	6.2	LOS A	0.2	1.3	0.23	0.54	0.23	32.1
West: Wyndham Avenue															
10	L2	All MCs	31	0.0	31	0.0	0.070	5.5	LOS A	0.0	0.1	0.00	0.14	0.00	33.1
11	T1	All MCs	98	5.7	98	5.7	0.070	0.0	LOS A	0.0	0.1	0.00	0.14	0.00	50.7
12	R2	All MCs	1	0.0	1	0.0	0.070	4.6	LOS A	0.0	0.1	0.00	0.14	0.00	49.2
Approach			130	4.3	130	4.3	0.070	1.3	NA	0.0	0.1	0.00	0.14	0.00	44.6
All Vehicles			399	14.9	399	14.9	0.149	3.6	NA	0.8	6.2	0.18	0.35	0.18	35.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 602 [602 - Lachley Street / Wyndham Avenue / Patterson Street PM Peak (16:00 - 17:00) (Site Folder: 2028 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base + Development PM Peak (Network Folder: 2028 Base + Development)]

Base + Development PM 2028
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Patterson Street															
1	L2	All MCs	1	0.0	1	0.0	0.003	4.8	LOS A	0.0	0.1	0.26	0.48	0.26	43.9
2	T1	All MCs	1	0.0	1	0.0	0.003	3.9	LOS A	0.0	0.1	0.26	0.48	0.26	43.6
3	R2	All MCs	1	0.0	1	0.0	0.003	6.4	LOS A	0.0	0.1	0.26	0.48	0.26	43.9
Approach			3	0.0	3	0.0	0.003	5.1	LOS A	0.0	0.1	0.26	0.48	0.26	43.8
East: Wyndham Avenue															
4	L2	All MCs	1	0.0	1	0.0	0.074	4.9	LOS A	0.3	2.1	0.14	0.23	0.14	48.2
5	T1	All MCs	82	0.0	82	0.0	0.074	0.2	LOS A	0.3	2.1	0.14	0.23	0.14	48.9
6	R2	All MCs	41	28.2	41	28.2	0.074	6.1	LOS A	0.3	2.1	0.14	0.23	0.14	45.6
Approach			125	9.3	125	9.3	0.074	2.2	NA	0.3	2.1	0.14	0.23	0.14	47.6
North: Lachley Street															
7	L2	All MCs	161	28.1	161	28.1	0.158	5.9	LOS A	0.7	5.7	0.19	0.54	0.19	31.3
8	T1	All MCs	1	0.0	1	0.0	0.158	4.1	LOS A	0.7	5.7	0.19	0.54	0.19	43.8
9	R2	All MCs	34	0.0	34	0.0	0.158	6.6	LOS A	0.7	5.7	0.19	0.54	0.19	31.3
Approach			196	23.1	196	23.1	0.158	6.0	LOS A	0.7	5.7	0.19	0.54	0.19	31.6
West: Wyndham Avenue															
10	L2	All MCs	10	0.0	10	0.0	0.041	5.4	LOS A	0.0	0.1	0.01	0.08	0.01	32.9
11	T1	All MCs	67	0.0	67	0.0	0.041	0.0	LOS A	0.0	0.1	0.01	0.08	0.01	50.2
12	R2	All MCs	1	0.0	1	0.0	0.041	4.6	LOS A	0.0	0.1	0.01	0.08	0.01	49.0
Approach			77	0.0	77	0.0	0.041	0.7	NA	0.0	0.1	0.01	0.08	0.01	46.8
All Vehicles			401	14.2	401	14.2	0.158	3.8	NA	0.7	5.7	0.14	0.36	0.14	43.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 503 [503 - Wyndham Avenue / Calarie Road AM Peak (08:00 - 09:00) (Site Folder: 2028 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base + Development AM Peak (Network Folder: 2028 Base + Development)]

Base + Development AM 2028
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	13	16.7	13	16.7	0.126	4.9	LOS A	0.4	3.4	0.12	0.59	0.12	44.9
2	T1	All MCs	36	18.5	36	18.5	0.126	4.4	LOS A	0.4	3.4	0.12	0.59	0.12	44.5
3	R2	All MCs	95	1.2	95	1.2	0.126	7.2	LOS A	0.4	3.4	0.12	0.59	0.12	44.5
3u	U	All MCs	10	77.8	10	77.8	0.126	9.1	LOS A	0.4	3.4	0.12	0.59	0.12	44.5
Approach			155	11.5	155	11.5	0.126	6.5	LOS A	0.4	3.4	0.12	0.59	0.12	44.6
East: Wyndham Avenue															
4	L2	All MCs	59	3.8	59	3.8	0.087	4.7	LOS A	0.3	1.9	0.17	0.53	0.17	46.9
5	T1	All MCs	22	5.0	22	5.0	0.087	4.1	LOS A	0.3	1.9	0.17	0.53	0.17	46.5
6	R2	All MCs	13	0.0	13	0.0	0.087	6.9	LOS A	0.3	1.9	0.17	0.53	0.17	46.0
6u	U	All MCs	6	0.0	6	0.0	0.087	8.4	LOS A	0.3	1.9	0.17	0.53	0.17	46.0
Approach			100	3.3	100	3.3	0.087	5.1	LOS A	0.3	1.9	0.17	0.53	0.17	46.7
North: Calarie Road															
7	L2	All MCs	16	7.1	16	7.1	0.083	5.0	LOS A	0.4	3.2	0.39	0.50	0.39	47.4
8	T1	All MCs	62	14.3	62	14.3	0.083	5.2	LOS A	0.4	3.2	0.39	0.50	0.39	47.7
9	R2	All MCs	1	0.0	1	0.0	0.083	7.9	LOS A	0.4	3.2	0.39	0.50	0.39	47.1
Approach			79	12.7	79	12.7	0.083	5.2	LOS A	0.4	3.2	0.39	0.50	0.39	47.6
West: Wyndham Avenue															
10	L2	All MCs	1	0.0	1	0.0	0.078	4.6	LOS A	0.3	1.9	0.24	0.50	0.24	42.1
11	T1	All MCs	64	0.0	64	0.0	0.078	4.2	LOS A	0.3	1.9	0.24	0.50	0.24	42.1
12	R2	All MCs	20	16.7	20	16.7	0.078	7.6	LOS A	0.3	1.9	0.24	0.50	0.24	44.5
Approach			85	3.9	85	3.9	0.078	5.0	LOS A	0.3	1.9	0.24	0.50	0.24	43.1
All Vehicles			418	8.3	418	8.3	0.126	5.6	LOS A	0.4	3.4	0.21	0.54	0.21	46.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 603 [603 - Wyndham Avenue / Calarie Road PM Peak (16:00 - 17:00) (Site Folder: 2028 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base + Development PM Peak (Network Folder: 2028 Base + Development)]

Base + Development PM 2028
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	11	0.0	11	0.0	0.077	4.8	LOS A	0.3	1.8	0.15	0.53	0.15	45.2
2	T1	All MCs	50	0.0	50	0.0	0.077	4.1	LOS A	0.3	1.8	0.15	0.53	0.15	44.5
3	R2	All MCs	31	0.0	31	0.0	0.077	7.2	LOS A	0.3	1.8	0.15	0.53	0.15	44.5
Approach			92	0.0	92	0.0	0.077	5.2	LOS A	0.3	1.8	0.15	0.53	0.15	44.6
East: Wyndham Avenue															
4	L2	All MCs	87	1.3	87	1.3	0.122	4.8	LOS A	0.4	2.6	0.13	0.52	0.13	48.4
5	T1	All MCs	46	0.0	46	0.0	0.122	3.9	LOS A	0.4	2.6	0.13	0.52	0.13	47.4
6	R2	All MCs	16	0.0	16	0.0	0.122	6.8	LOS A	0.4	2.6	0.13	0.52	0.13	47.3
6u	U	All MCs	3	0.0	3	0.0	0.122	8.3	LOS A	0.4	2.6	0.13	0.52	0.13	47.3
Approach			152	0.7	152	0.7	0.122	4.8	LOS A	0.4	2.6	0.13	0.52	0.13	48.0
North: Calarie Road															
7	L2	All MCs	12	0.0	12	0.0	0.055	4.1	LOS A	0.3	1.9	0.22	0.46	0.22	49.2
8	T1	All MCs	45	0.0	45	0.0	0.055	4.4	LOS A	0.3	1.9	0.22	0.46	0.22	49.7
9	R2	All MCs	6	20.0	6	20.0	0.055	7.4	LOS A	0.3	1.9	0.22	0.46	0.22	48.3
Approach			63	1.8	63	1.8	0.055	4.6	LOS A	0.3	1.9	0.22	0.46	0.22	49.5
West: Wyndham Avenue															
10	L2	All MCs	1	0.0	1	0.0	0.035	4.4	LOS A	0.1	0.8	0.18	0.52	0.18	41.9
11	T1	All MCs	25	0.0	25	0.0	0.035	3.9	LOS A	0.1	0.8	0.18	0.52	0.18	41.9
12	R2	All MCs	16	0.0	16	0.0	0.035	7.0	LOS A	0.1	0.8	0.18	0.52	0.18	44.7
Approach			41	0.0	41	0.0	0.035	5.1	LOS A	0.1	0.8	0.18	0.52	0.18	43.5
All Vehicles			348	0.6	348	0.6	0.122	4.9	LOS A	0.4	2.6	0.16	0.51	0.16	47.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 504 [504 - Calarie Road / School Road AM Peak (08:00 - 09:00) (Site Folder: 2028 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base + Development AM Peak (Network Folder: 2028 Base + Development)]

Base + Development AM 2028
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	1	0.0	1	0.0	0.021	7.1	LOS A	0.1	0.5	0.08	0.23	0.08	60.6
2	T1	All MCs	23	14.3	23	14.3	0.021	0.1	LOS A	0.1	0.5	0.08	0.23	0.08	71.3
3	R2	All MCs	13	0.0	13	0.0	0.021	5.6	LOS A	0.1	0.5	0.08	0.23	0.08	63.6
Approach			37	9.0	37	9.0	0.021	2.1	NA	0.1	0.5	0.08	0.23	0.08	68.1
East: New Road															
4	L2	All MCs	4	0.0	4	0.0	0.006	5.6	LOS A	0.0	0.1	0.13	0.54	0.13	50.5
5	T1	All MCs	1	0.0	1	0.0	0.006	4.4	LOS A	0.0	0.1	0.13	0.54	0.13	53.1
6	R2	All MCs	2	0.0	2	0.0	0.006	5.8	LOS A	0.0	0.1	0.13	0.54	0.13	52.4
Approach			8	0.0	8	0.0	0.006	5.5	LOS A	0.0	0.1	0.13	0.54	0.13	51.8
North: Calarie Road															
7	L2	All MCs	4	0.0	4	0.0	0.028	5.6	LOS A	0.1	0.4	0.04	0.15	0.04	62.8
8	T1	All MCs	38	5.9	38	5.9	0.028	0.0	LOS A	0.1	0.4	0.04	0.15	0.04	72.6
9	R2	All MCs	8	14.3	8	14.3	0.028	6.9	LOS A	0.1	0.4	0.04	0.15	0.04	56.9
Approach			50	6.7	50	6.7	0.028	1.6	NA	0.1	0.4	0.04	0.15	0.04	66.6
West: School Road															
10	L2	All MCs	7	16.7	7	16.7	0.007	4.8	LOS A	0.0	0.2	0.10	0.50	0.10	50.4
11	T1	All MCs	1	0.0	1	0.0	0.007	4.4	LOS A	0.0	0.2	0.10	0.50	0.10	49.9
12	R2	All MCs	1	0.0	1	0.0	0.007	4.9	LOS A	0.0	0.2	0.10	0.50	0.10	45.1
Approach			9	12.5	9	12.5	0.007	4.8	LOS A	0.0	0.2	0.10	0.50	0.10	50.0
All Vehicles			104	7.5	104	7.5	0.028	2.3	NA	0.1	0.5	0.07	0.24	0.07	64.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 604 [604 - Calarie Road / School Road PM Peak (16:00 - 17:00) (Site Folder: 2028 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2028 Base + Development PM Peak (Network Folder: 2028 Base + Development)]

Base + Development PM 2028
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 4 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	4	0.0	4	0.0	0.022	7.0	LOS A	0.0	0.2	0.03	0.13	0.03	64.5
2	T1	All MCs	33	0.0	33	0.0	0.022	0.0	LOS A	0.0	0.2	0.03	0.13	0.03	76.8
3	R2	All MCs	4	0.0	4	0.0	0.022	5.5	LOS A	0.0	0.2	0.03	0.13	0.03	68.0
Approach			42	0.0	42	0.0	0.022	1.3	NA	0.0	0.2	0.03	0.13	0.03	74.3
East: New Road															
4	L2	All MCs	15	0.0	15	0.0	0.014	5.6	LOS A	0.1	0.4	0.10	0.54	0.10	50.4
5	T1	All MCs	1	0.0	1	0.0	0.014	4.4	LOS A	0.1	0.4	0.10	0.54	0.10	53.1
6	R2	All MCs	4	0.0	4	0.0	0.014	5.8	LOS A	0.1	0.4	0.10	0.54	0.10	52.4
Approach			20	0.0	20	0.0	0.014	5.6	LOS A	0.1	0.4	0.10	0.54	0.10	51.3
North: Calarie Road															
7	L2	All MCs	2	0.0	2	0.0	0.023	5.6	LOS A	0.1	0.4	0.06	0.16	0.06	63.1
8	T1	All MCs	31	0.0	31	0.0	0.023	0.0	LOS A	0.1	0.4	0.06	0.16	0.06	73.4
9	R2	All MCs	8	14.3	8	14.3	0.023	7.0	LOS A	0.1	0.4	0.06	0.16	0.06	57.1
Approach			41	2.7	41	2.7	0.023	1.6	NA	0.1	0.4	0.06	0.16	0.06	66.7
West: School Road															
10	L2	All MCs	10	0.0	10	0.0	0.008	4.6	LOS A	0.0	0.2	0.10	0.50	0.10	53.8
11	T1	All MCs	1	0.0	1	0.0	0.008	4.4	LOS A	0.0	0.2	0.10	0.50	0.10	49.7
12	R2	All MCs	1	0.0	1	0.0	0.008	5.0	LOS A	0.0	0.2	0.10	0.50	0.10	44.7
Approach			12	0.0	12	0.0	0.008	4.7	LOS A	0.0	0.2	0.10	0.50	0.10	52.9
All Vehicles			116	1.0	116	1.0	0.023	2.5	NA	0.1	0.4	0.06	0.25	0.06	66.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

APPENDIX C-4

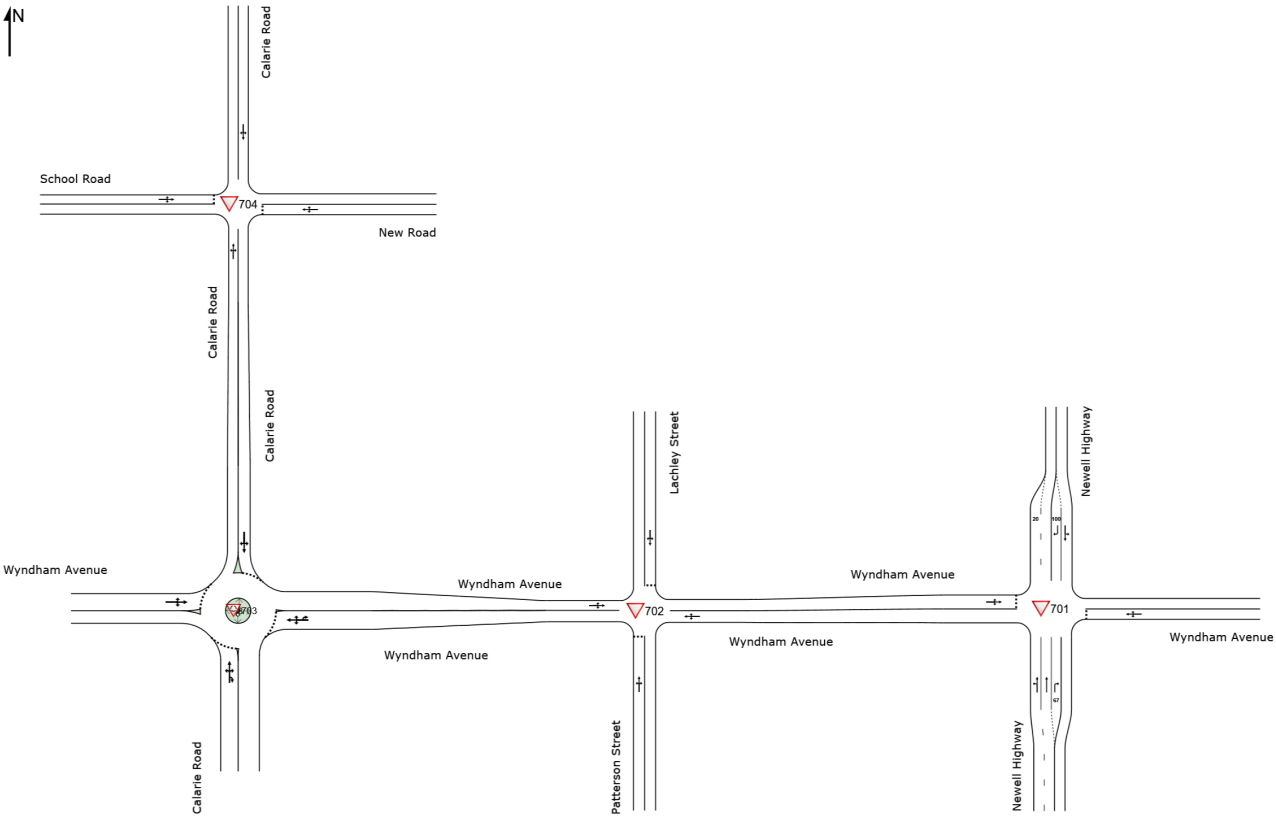
Base Case + Development – 2038

NETWORK LAYOUT

Network: N101 [2038 Base + Development AM Peak (Network Folder: 2038 Base + Development (10-Year))]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
▽701	NA	701 - Wyndham Avenue / Newell Highway AM Peak (08:00 - 09:00)
▽702	NA	702 - Lachley Street / Wyndham Avenue / Patterson Street AM Peak (08:00 - 09:00)
▽703	NA	703 - Wyndham Avenue / Calarie Road AM Peak (08:00 - 09:00)
▽704	NA	704 - Calarie Road / School Road AM Peak (08:00 - 09:00)

MOVEMENT SUMMARY

Site: 701 [701 - Wyndham Avenue / Newell Highway AM Peak (08:00 - 09:00) (Site Folder: 2038 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2038 Base + Development AM Peak (Network Folder: 2038 Base + Development (10-Year))]

Base + Development AM 2038
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 14 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Newell Highway															
1	L2	All MCs	176	19.7	176	19.7	0.108	6.4	LOS A	0.0	0.0	0.00	0.59	0.00	59.3
2	T1	All MCs	275	24.8	275	24.8	0.164	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
3	R2	All MCs	13	0.0	13	0.0	0.010	7.6	LOS A	0.0	0.3	0.39	0.60	0.39	60.1
Approach			464	22.2	464	22.2	0.164	2.7	NA	0.0	0.3	0.01	0.24	0.01	73.2
East: Wyndham Avenue															
4	L2	All MCs	13	10.0	13	10.0	0.083	6.2	LOS A	0.3	2.0	0.66	0.76	0.66	53.6
5	T1	All MCs	8	16.7	8	16.7	0.083	26.9	LOS B	0.3	2.0	0.66	0.76	0.66	33.4
6	R2	All MCs	4	0.0	4	0.0	0.083	20.1	LOS B	0.3	2.0	0.66	0.76	0.66	54.3
Approach			24	10.5	24	10.5	0.083	14.9	LOS B	0.3	2.0	0.66	0.76	0.66	50.1
North: Newell Highway															
7	L2	All MCs	5	75.0	5	75.0	0.174	8.4	LOS A	0.0	0.0	0.00	0.01	0.00	59.4
8	T1	All MCs	288	24.6	288	24.6	0.174	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	79.8
9	R2	All MCs	95	20.6	95	20.6	0.134	10.3	LOS A	0.5	4.2	0.53	0.77	0.53	61.6
Approach			389	24.3	389	24.3	0.174	2.7	NA	0.5	4.2	0.13	0.20	0.13	76.4
West: Wyndham Avenue															
10	L2	All MCs	65	5.2	65	5.2	0.496	5.3	LOS A	2.4	18.6	0.03	0.52	0.03	60.1
11	T1	All MCs	10	25.0	10	25.0	0.496	5.2	LOS A	2.4	18.6	0.03	0.52	0.03	45.6
12	R2	All MCs	55	15.2	55	15.2	0.496	6.8	LOS A	2.4	18.6	0.03	0.52	0.03	56.6
Approach			131	11.0	131	11.0	0.496	5.9	LOS A	2.4	18.6	0.03	0.52	0.03	57.7
All Vehicles			1007	21.3	1007	21.3	0.496	3.4	NA	2.4	18.6	0.08	0.27	0.08	71.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 801 [801 - Wyndham Avenue / Newell Highway PM Peak (16:00 - 17:00) (Site Folder: 2038 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2038 Base + Development PM Peak (Network Folder: 2038 Base + Development (10-Year))]

Base + Development PM 2038
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 14 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Newell Highway															
1	L2	All MCs	85	29.4	85	29.4	0.054	6.9	LOS A	0.0	0.0	0.00	0.61	0.00	63.2
2	T1	All MCs	252	13.3	252	13.3	0.140	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
3	R2	All MCs	15	33.3	15	33.3	0.014	8.6	LOS A	0.1	0.5	0.41	0.62	0.41	59.4
Approach			352	18.0	352	18.0	0.140	2.1	NA	0.1	0.5	0.02	0.17	0.02	76.2
East: Wyndham Avenue															
4	L2	All MCs	27	9.5	27	9.5	0.080	6.1	LOS A	0.3	2.1	0.54	0.67	0.54	57.0
5	T1	All MCs	12	0.0	12	0.0	0.080	12.4	LOS A	0.3	2.1	0.54	0.67	0.54	38.3
6	R2	All MCs	4	33.3	4	33.3	0.080	22.2	LOS B	0.3	2.1	0.54	0.67	0.54	54.9
Approach			42	9.1	42	9.1	0.080	9.3	LOS A	0.3	2.1	0.54	0.67	0.54	54.2
North: Newell Highway															
7	L2	All MCs	5	0.0	5	0.0	0.166	7.0	LOS A	0.0	0.0	0.00	0.01	0.00	75.0
8	T1	All MCs	280	23.8	280	23.8	0.166	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	79.7
9	R2	All MCs	72	39.5	72	39.5	0.089	9.8	LOS A	0.3	3.1	0.46	0.70	0.46	65.2
Approach			357	26.6	357	26.6	0.166	2.1	NA	0.3	3.1	0.09	0.15	0.09	77.7
West: Wyndham Avenue															
10	L2	All MCs	57	16.6	57	16.6	0.844	5.9	LOS A	14.5	118.3	0.14	0.48	0.14	54.5
11	T1	All MCs	4	0.0	4	0.0	0.844	7.2	LOS A	14.5	118.3	0.14	0.48	0.14	44.3
12	R2	All MCs	170	21.1	170	21.1	0.844	12.3	LOS A	14.5	118.3	0.14	0.48	0.14	53.0
Approach			230	19.6	230	19.6	0.844	10.6	LOS A	14.5	118.3	0.14	0.48	0.14	53.3
All Vehicles			982	21.2	982	21.2	0.844	4.4	NA	14.5	118.3	0.10	0.26	0.10	69.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 702 [702 - Lachley Street / Wyndham Avenue / Patterson Street AM Peak (08:00 - 09:00) (Site Folder: 2038 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2038 Base + Development AM Peak (Network Folder: 2038 Base + Development (10-Year))]

Base + Development AM 2038
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 14 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Patterson Street															
1	L2	All MCs	1	0.0	1	0.0	0.004	4.8	LOS A	0.0	0.1	0.30	0.49	0.30	43.6
2	T1	All MCs	1	0.0	1	0.0	0.004	4.8	LOS A	0.0	0.1	0.30	0.49	0.30	43.3
3	R2	All MCs	1	0.0	1	0.0	0.004	6.7	LOS A	0.0	0.1	0.30	0.49	0.30	43.6
Approach			4	0.0	4	0.0	0.004	5.4	LOS A	0.0	0.1	0.30	0.49	0.30	43.5
East: Wyndham Avenue															
4	L2	All MCs	1	0.0	1	0.0	0.157	5.2	LOS A	0.8	6.5	0.29	0.42	0.29	47.7
5	T1	All MCs	86	4.5	86	4.5	0.157	0.6	LOS A	0.8	6.5	0.29	0.42	0.29	47.9
6	R2	All MCs	143	27.9	143	27.9	0.157	6.5	LOS A	0.8	6.5	0.29	0.42	0.29	25.8
Approach			231	19.0	231	19.0	0.157	4.3	NA	0.8	6.5	0.29	0.42	0.29	30.5
North: Lachley Street															
7	L2	All MCs	37	28.4	37	28.4	0.042	6.1	LOS A	0.2	1.3	0.25	0.55	0.25	30.8
8	T1	All MCs	1	0.0	1	0.0	0.042	4.9	LOS A	0.2	1.3	0.25	0.55	0.25	43.6
9	R2	All MCs	9	0.0	9	0.0	0.042	7.5	LOS A	0.2	1.3	0.25	0.55	0.25	30.8
Approach			47	22.4	47	22.4	0.042	6.3	LOS A	0.2	1.3	0.25	0.55	0.25	32.0
West: Wyndham Avenue															
10	L2	All MCs	31	0.0	31	0.0	0.078	5.5	LOS A	0.0	0.1	0.01	0.13	0.01	33.1
11	T1	All MCs	113	5.7	113	5.7	0.078	0.0	LOS A	0.0	0.1	0.01	0.13	0.01	50.6
12	R2	All MCs	1	0.0	1	0.0	0.078	4.6	LOS A	0.0	0.1	0.01	0.13	0.01	49.2
Approach			145	4.4	145	4.4	0.078	1.2	NA	0.0	0.1	0.01	0.13	0.01	45.0
All Vehicles			427	14.3	427	14.3	0.157	3.5	NA	0.8	6.5	0.19	0.34	0.19	36.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 802 [802 - Lachley Street / Wyndham Avenue / Patterson Street PM Peak (16:00 - 17:00) (Site Folder: 2038 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2038 Base + Development PM Peak (Network Folder: 2038 Base + Development (10-Year))]

Base + Development PM 2038
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 14 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Patterson Street															
1	L2	All MCs	1	0.0	1	0.0	0.004	4.8	LOS A	0.0	0.1	0.28	0.49	0.28	43.8
2	T1	All MCs	1	0.0	1	0.0	0.004	4.0	LOS A	0.0	0.1	0.28	0.49	0.28	43.6
3	R2	All MCs	1	0.0	1	0.0	0.004	6.6	LOS A	0.0	0.1	0.28	0.49	0.28	43.8
Approach			4	0.0	4	0.0	0.004	5.1	LOS A	0.0	0.1	0.28	0.49	0.28	43.7
East: Wyndham Avenue															
4	L2	All MCs	1	0.0	1	0.0	0.081	4.9	LOS A	0.3	2.2	0.14	0.21	0.14	48.2
5	T1	All MCs	95	0.0	95	0.0	0.081	0.2	LOS A	0.3	2.2	0.14	0.21	0.14	48.9
6	R2	All MCs	41	28.0	41	28.0	0.081	6.1	LOS A	0.3	2.2	0.14	0.21	0.14	45.5
Approach			138	8.4	138	8.4	0.081	2.0	NA	0.3	2.2	0.14	0.21	0.14	47.7
North: Lachley Street															
7	L2	All MCs	161	28.1	161	28.1	0.160	6.0	LOS A	0.7	5.8	0.21	0.55	0.21	31.2
8	T1	All MCs	1	0.0	1	0.0	0.160	4.3	LOS A	0.7	5.8	0.21	0.55	0.21	43.7
9	R2	All MCs	34	0.0	34	0.0	0.160	6.7	LOS A	0.7	5.8	0.21	0.55	0.21	31.2
Approach			196	23.0	196	23.0	0.160	6.1	LOS A	0.7	5.8	0.21	0.55	0.21	31.5
West: Wyndham Avenue															
10	L2	All MCs	10	0.0	10	0.0	0.046	5.4	LOS A	0.0	0.1	0.01	0.07	0.01	32.9
11	T1	All MCs	77	0.0	77	0.0	0.046	0.0	LOS A	0.0	0.1	0.01	0.07	0.01	50.2
12	R2	All MCs	1	0.0	1	0.0	0.046	4.6	LOS A	0.0	0.1	0.01	0.07	0.01	48.9
Approach			88	0.0	88	0.0	0.046	0.7	NA	0.0	0.1	0.01	0.07	0.01	47.1
All Vehicles			426	13.3	426	13.3	0.160	3.6	NA	0.7	5.8	0.15	0.34	0.15	44.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 703 [703 - Wyndham Avenue / Calarie Road AM Peak (08:00 - 09:00) (Site Folder: 2038 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2038 Base + Development AM Peak (Network Folder: 2038 Base + Development (10-Year))]

Base + Development AM 2038
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 14 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	15	16.7	15	16.7	0.142	4.9	LOS A	0.5	3.9	0.13	0.59	0.13	44.8
2	T1	All MCs	40	19.3	40	19.3	0.142	4.4	LOS A	0.5	3.9	0.13	0.59	0.13	44.3
3	R2	All MCs	105	1.2	105	1.2	0.142	7.2	LOS A	0.5	3.9	0.13	0.59	0.13	44.3
3u	U	All MCs	12	77.8	12	77.8	0.142	9.1	LOS A	0.5	3.9	0.13	0.59	0.13	44.4
Approach			172	11.9	172	11.9	0.142	6.5	LOS A	0.5	3.9	0.13	0.59	0.13	44.4
East: Wyndham Avenue															
4	L2	All MCs	66	3.9	66	3.9	0.100	4.7	LOS A	0.3	2.3	0.19	0.53	0.19	46.7
5	T1	All MCs	26	5.0	26	5.0	0.100	4.1	LOS A	0.3	2.3	0.19	0.53	0.19	46.4
6	R2	All MCs	15	0.0	15	0.0	0.100	7.0	LOS A	0.3	2.3	0.19	0.53	0.19	45.9
6u	U	All MCs	6	0.0	6	0.0	0.100	8.4	LOS A	0.3	2.3	0.19	0.53	0.19	45.9
Approach			114	3.4	114	3.4	0.100	5.1	LOS A	0.3	2.3	0.19	0.53	0.19	46.6
North: Calarie Road															
7	L2	All MCs	18	7.1	18	7.1	0.098	5.3	LOS A	0.5	3.8	0.42	0.52	0.42	47.3
8	T1	All MCs	71	14.4	71	14.4	0.098	5.4	LOS A	0.5	3.8	0.42	0.52	0.42	47.6
9	R2	All MCs	1	0.0	1	0.0	0.098	8.1	LOS A	0.5	3.8	0.42	0.52	0.42	47.0
Approach			90	12.8	90	12.8	0.098	5.4	LOS A	0.5	3.8	0.42	0.52	0.42	47.5
West: Wyndham Avenue															
10	L2	All MCs	1	0.0	1	0.0	0.091	4.7	LOS A	0.3	2.3	0.26	0.51	0.26	42.0
11	T1	All MCs	73	0.0	73	0.0	0.091	4.3	LOS A	0.3	2.3	0.26	0.51	0.26	42.0
12	R2	All MCs	23	16.7	23	16.7	0.091	7.7	LOS A	0.3	2.3	0.26	0.51	0.26	44.4
Approach			98	3.9	98	3.9	0.091	5.1	LOS A	0.3	2.3	0.26	0.51	0.26	43.0
All Vehicles			474	8.4	474	8.4	0.142	5.7	LOS A	0.5	3.9	0.23	0.54	0.23	45.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 803 [803 - Wyndham Avenue / Calarie Road PM Peak (16:00 - 17:00) (Site Folder: 2038 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2038 Base + Development PM Peak (Network Folder: 2038 Base + Development (10-Year))]

Base + Development PM 2038
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 14 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	13	0.0	13	0.0	0.088	4.8	LOS A	0.3	2.1	0.16	0.53	0.16	45.1
2	T1	All MCs	57	0.0	57	0.0	0.088	4.1	LOS A	0.3	2.1	0.16	0.53	0.16	44.3
3	R2	All MCs	34	0.0	34	0.0	0.088	7.2	LOS A	0.3	2.1	0.16	0.53	0.16	44.3
Approach			104	0.0	104	0.0	0.088	5.2	LOS A	0.3	2.1	0.16	0.53	0.16	44.5
East: Wyndham Avenue															
4	L2	All MCs	96	1.3	96	1.3	0.137	4.8	LOS A	0.4	3.0	0.14	0.52	0.14	48.2
5	T1	All MCs	53	0.0	53	0.0	0.137	4.0	LOS A	0.4	3.0	0.14	0.52	0.14	47.3
6	R2	All MCs	18	0.0	18	0.0	0.137	6.9	LOS A	0.4	3.0	0.14	0.52	0.14	47.1
6u	U	All MCs	4	0.0	4	0.0	0.137	8.3	LOS A	0.4	3.0	0.14	0.52	0.14	47.1
Approach			170	0.8	170	0.8	0.137	4.8	LOS A	0.4	3.0	0.14	0.52	0.14	47.8
North: Calarie Road															
7	L2	All MCs	14	0.0	14	0.0	0.062	4.2	LOS A	0.3	2.2	0.24	0.47	0.24	49.0
8	T1	All MCs	50	0.0	50	0.0	0.062	4.5	LOS A	0.3	2.2	0.24	0.47	0.24	49.4
9	R2	All MCs	6	20.0	6	20.0	0.062	7.5	LOS A	0.3	2.2	0.24	0.47	0.24	48.1
Approach			70	1.8	70	1.8	0.062	4.7	LOS A	0.3	2.2	0.24	0.47	0.24	49.2
West: Wyndham Avenue															
10	L2	All MCs	1	0.0	1	0.0	0.041	4.4	LOS A	0.1	1.0	0.19	0.52	0.19	41.8
11	T1	All MCs	28	0.0	28	0.0	0.041	4.0	LOS A	0.1	1.0	0.19	0.52	0.19	41.8
12	R2	All MCs	18	0.0	18	0.0	0.041	7.1	LOS A	0.1	1.0	0.19	0.52	0.19	44.6
Approach			48	0.0	48	0.0	0.041	5.2	LOS A	0.1	1.0	0.19	0.52	0.19	43.4
All Vehicles			392	0.7	392	0.7	0.137	4.9	LOS A	0.4	3.0	0.17	0.51	0.17	47.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 704 [704 - Calarie Road / School Road AM Peak (08:00 - 09:00) (Site Folder: 2038 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2038 Base + Development AM Peak (Network Folder: 2038 Base + Development (10-Year))]

Base + Development AM 2038
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 14 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	1	0.0	1	0.0	0.023	7.1	LOS A	0.1	0.5	0.08	0.21	0.08	61.0
2	T1	All MCs	27	14.3	27	14.3	0.023	0.1	LOS A	0.1	0.5	0.08	0.21	0.08	71.8
3	R2	All MCs	13	0.0	13	0.0	0.023	5.6	LOS A	0.1	0.5	0.08	0.21	0.08	64.1
Approach			41	9.4	41	9.4	0.023	2.0	NA	0.1	0.5	0.08	0.21	0.08	68.8
East: New Road															
4	L2	All MCs	4	0.0	4	0.0	0.006	5.7	LOS A	0.0	0.2	0.14	0.54	0.14	50.5
5	T1	All MCs	1	0.0	1	0.0	0.006	4.5	LOS A	0.0	0.2	0.14	0.54	0.14	53.1
6	R2	All MCs	2	0.0	2	0.0	0.006	5.9	LOS A	0.0	0.2	0.14	0.54	0.14	52.4
Approach			8	0.0	8	0.0	0.006	5.5	LOS A	0.0	0.2	0.14	0.54	0.14	51.8
North: Calarie Road															
7	L2	All MCs	4	0.0	4	0.0	0.032	5.6	LOS A	0.1	0.5	0.04	0.15	0.04	62.9
8	T1	All MCs	44	5.9	44	5.9	0.032	0.0	LOS A	0.1	0.5	0.04	0.15	0.04	72.8
9	R2	All MCs	9	14.3	9	14.3	0.032	6.9	LOS A	0.1	0.5	0.04	0.15	0.04	57.0
Approach			57	6.7	57	6.7	0.032	1.5	NA	0.1	0.5	0.04	0.15	0.04	66.8
West: School Road															
10	L2	All MCs	8	16.7	8	16.7	0.008	4.8	LOS A	0.0	0.2	0.10	0.50	0.10	50.4
11	T1	All MCs	1	0.0	1	0.0	0.008	4.5	LOS A	0.0	0.2	0.10	0.50	0.10	49.9
12	R2	All MCs	1	0.0	1	0.0	0.008	5.0	LOS A	0.0	0.2	0.10	0.50	0.10	45.1
Approach			10	12.5	10	12.5	0.008	4.8	LOS A	0.0	0.2	0.10	0.50	0.10	49.9
All Vehicles			117	7.7	117	7.7	0.032	2.3	NA	0.1	0.5	0.07	0.23	0.07	65.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 804 [804 - Calarie Road / School Road PM Peak (16:00 - 17:00) (Site Folder: 2038 Base + Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2038 Base + Development PM Peak (Network Folder: 2038 Base + Development (10-Year))]

Base + Development PM 2038
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 14 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Calarie Road															
1	L2	All MCs	5	0.0	5	0.0	0.026	7.0	LOS A	0.0	0.2	0.03	0.13	0.03	64.7
2	T1	All MCs	39	0.0	39	0.0	0.026	0.0	LOS A	0.0	0.2	0.03	0.13	0.03	77.0
3	R2	All MCs	4	0.0	4	0.0	0.026	5.5	LOS A	0.0	0.2	0.03	0.13	0.03	68.1
Approach			48	0.0	48	0.0	0.026	1.3	NA	0.0	0.2	0.03	0.13	0.03	74.5
East: New Road															
4	L2	All MCs	15	0.0	15	0.0	0.015	5.6	LOS A	0.1	0.4	0.12	0.54	0.12	50.4
5	T1	All MCs	1	0.0	1	0.0	0.015	4.5	LOS A	0.1	0.4	0.12	0.54	0.12	53.0
6	R2	All MCs	4	0.0	4	0.0	0.015	5.9	LOS A	0.1	0.4	0.12	0.54	0.12	52.3
Approach			21	0.0	21	0.0	0.015	5.6	LOS A	0.1	0.4	0.12	0.54	0.12	51.3
North: Calarie Road															
7	L2	All MCs	2	0.0	2	0.0	0.026	5.6	LOS A	0.1	0.4	0.06	0.16	0.06	63.1
8	T1	All MCs	36	0.0	36	0.0	0.026	0.0	LOS A	0.1	0.4	0.06	0.16	0.06	73.4
9	R2	All MCs	9	14.3	9	14.3	0.026	7.0	LOS A	0.1	0.4	0.06	0.16	0.06	57.1
Approach			47	2.7	47	2.7	0.026	1.6	NA	0.1	0.4	0.06	0.16	0.06	66.7
West: School Road															
10	L2	All MCs	12	0.0	12	0.0	0.010	4.7	LOS A	0.0	0.3	0.11	0.50	0.11	53.8
11	T1	All MCs	1	0.0	1	0.0	0.010	4.4	LOS A	0.0	0.3	0.11	0.50	0.11	49.6
12	R2	All MCs	1	0.0	1	0.0	0.010	5.0	LOS A	0.0	0.3	0.11	0.50	0.11	44.7
Approach			14	0.0	14	0.0	0.010	4.7	LOS A	0.0	0.3	0.11	0.50	0.11	52.8
All Vehicles			130	1.0	130	1.0	0.026	2.5	NA	0.1	0.4	0.06	0.24	0.06	67.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.